BRITISH MUSEUM
28 MAR 1968
NATURAL HISTORY

PROCEEDINGS
OF THE

Bournemouth Natural Science Society

VOL. LVII

SESSION 1966-67

Price . Five Shillings

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PUBLISHED BY THE SOCIETY AT ITS HOUSE,
39 CHRISTCHURCH ROAD, BOURNEMOUTH, 1968

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Introductory Note

The objects of the Society are declared in the second of its Rules to be "the promotion of the study of Science in all its branches, and of Public Education, by means of Lectures, Field Meetings, the reading and discussion of Papers, and in any way that the Council of the Society shall deem advisable".

The branches of Science at present represented are as follows:— **Archaeology and History, Astronomy, Botany, Geography, Geology, Photography, Physics and Chemistry, Zoology—Birds, Insects, Mammals.**

During the Winter Session, from October to April, lectures on matters of scientific interest are held on two or three days a week. These are usually illustrated by slides, films, episcope pictures, specimens, diagrams, experiments, etc.

Throughout the Summer Session, from April to September, Excursions or Field Meetings are arranged on two or three days every week, when parties of members visit places of scientific interest under the guidance of section chairmen and other specialists, sometimes in or near Bournemouth, at other times farther afield by coach or train.

The Society possesses a Library from which books may be borrowed by members, and there is a Reading Room where works of reference may be consulted. The Museum contains many valuable scientific collections and specimens. The Library and the Museum serve to illustrate and illuminate the ten Sections of the Society. There is a well-equipped Dark Room for the use of members interested in photography. The house stands in a pleasant garden of over an acre.

The management of the Society is vested in a Council, which is elected at the Annual General Meeting. Members are elected by the Council. An Entrance Fee of 5/- is payable upon nomination for election. The Annual Subscription for Town Members is £2 (Life Membership: £15); for Associate Members, aged 12-18 years, it is 10/-. The Family Subscription (for members of a family living in the same house) is as follows:— first adult member, £2; second adult member, 30/-; each additional adult member, 20/-; children between 12 and 18 years (Associate Members), 5/- each. Applicants for Associate Membership pay no entrance fee. **Town Membership is confined to those who are resident within the Municipal, Urban District and Parish Boundaries listed below:—**

HAMPSHIRE: Bournemouth County Borough, Hurn, Sopley, Christchurch Municipal Borough, Christchurch East.

DORSET: Poole Municipal Borough, Wimborne Urban District, Hampreston, West Moors, West Parley.

Members, other than Associate Members, living outside the areas listed above shall pay half the above rates of subscription. (Life Membership £15.) Special subscription for visitors to Bournemouth, 5/- per month.

Every 3 months a Programme giving full details of all meetings is posted to every member. A Volume of Proceedings is published annually; adult members receive a copy.

Application Forms for Membership and further particulars may be obtained from the Honorary Deputy Secretary, Miss M. Hipperson, B.N.S.S., 39 Christchurch Road.

Bournemouth Natural Science Society

OFFICERS AND COUNCIL FOR 1967-68

N.B.—University degrees and other qualifications are inserted only at the first mention of names.

President

PROFESSOR F. HODSON, Ph.D., B.SC., F.G.S.

Vice-Presidents

A. J. BUTCHER, F.R.I.B.A.	MRS. A. K. HUNT, B.SC.
E. CHAMBERS, F.L.S.	MISS D. M. LOWTHER, B.SC.
MISS F. M. EXTON, B.A.	MISS M. A. M. PENROSE, B.SC.
H. V. HARRIS	W. J. READ, M.SC., F.R.I.C.
	D. A. WRAY, Ph.D., M.SC., F.G.S.

Chairman of Council: BRIG. A. B. D. EDWARDS, C.B.E., M.C.

Deputy Chairman: S. C. S. BROWN, F.D.S., R.C.S. (Eng.), F.R.E.

Council

THE VICE-PRESIDENTS, OFFICERS, CHAIRMEN OF SECTIONS AND CHAIRMEN OF COMMITTEES (*all ex-officio*)

T. M. BELL, B.A., M.B., B.Ch.	W. F. PERRY, B.SC.
E. E. G. BOITE	P. J. PIPER, F.R.I.C.S.
MRS. M. GRANGE-BENNETT	G. A. SHILLIDY, C.I.E.
W. J. MIDDLETON	MRS. M. P. YULE
W. E. PAGE, M.A.	A. E. WITHERS, F.A.I.

Chairmen of Sections

Archaeology and History: MRS. C. SIMPSON
Astronomy: C. M. PITHER, F.R.A.S., F.I.L.S.
Botany: MRS. A. K. HUNT, B.SC.
Geography: MISS F. M. EXTON, B.A. (*Chairman*)
Geology: D. A. WRAY, Ph.D., M.SC., F.G.S.
Photography: MISS U. M. OGLE
Physics and Chemistry: MRS. I. M. BIRCUMSHAW, B.SC.
Zoology—Birds: MRS. L. M. MADDOX
Insects: SQUADRON LEADER J. L. C. BANKS
Mammals: MISS K. M. BENNETTS

Hon. Treasurer: F. J. WOOD

Hon. Assistant Treasurer: MISS G. M. GREEN, B.A., L.ès L.

Hon. Secretary: F. C. FILDES

Hon. Deputy Secretary: MISS M. HIPPERSON

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Hon. Assistant Secretary (Dispatch): MRS. D. E. WITHERS

Hon. Librarian: H. S. HOLBROOK, B.SC., C.Eng., F.I.E.E.

Hon. Curator: MRS. N. SEPHTON, M.B., Ch.B.

Hon. Editor: D. T. ADAMS, M.A.

Hon. Slides Custodian: J. C. MITTON

Hon. Projectionists: *Ciné*—D. J. DUDLEY; *Still*—G. HOLROYD

Hon. Auditors

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Bankers

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COMMITTEES, 1967-68

Finance and General Purposes

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PRESIDENT, HON. TREASURER, HON. SECRETARY, CHAIRMAN OF CHAIRMEN OF SECTIONS COMMITTEE, HON. DEPUTY SECRETARY, HON. ASSISTANT TREASURER (*all ex-officio*)

S. C. S. BROWN, M. H. COCKE, H. V. HARRIS, MRS. A. K. HUNT, A. E. WITHERS

Library

Chairman: M. H. COCKE

D. T. ADAMS, H. S. HOLBROOK, MRS. A. W. WHITE

Museum

Chairman: MRS. N. SEPHTON

CHAIRMEN OF SECTIONS (*ex-officio*)

Garden

Chairman: MRS. W. CHOME

MRS. A. K. HUNT, MISS E. M. WHITAKER

House

Chairman: A. J. BUTCHER

F. C. FILDES, MISS D. M. LOWTHER, MRS. B. TAYLOR, MRS. D. E. WITHERS

Tea

Chairman: MISS E. M. WHITAKER

MISS I. K. BURROUGHS, MRS. J. S. G. KENWORTHY, MRS. W. H. LEE, MRS. M. E. POWIS, MISS F. ROWE, MISS W. A. SAUNDERS, MRS. B. TAYLOR, MISS J. WHITE, MRS. L. WYCHERLEY

Entertainment

Chairman: MISS M. ALLEN

MRS. E. M. FILDES, MRS. C. D. M. GOLDIE, F. W. MOSS

Visiting

Chairman: BRIG. A. B. D. EDWARDS

MRS. W. CHOME, MISS M. HIPPERSON, W. E. PAGE

Bournemouth Natural Science Society
List of Members

Revised to 17th February, 1968

*Honorary Member
vVice-President
†Past President
wGilbert White Fellowship
lLife Member
oOriginal Member
aAssociate Member

The year of election is given before the name of each member

1961	Adams, D. T., M.A.	13 Sandy Mead Road, Queen's Park
1961	Adams, Mrs. M.	,, ,,
1958	Agar, R., A.M.I.C.E.	84 Howard Road
1961	Aiers, Miss E. M.	Flat 2, Earlston, 8 Portarlington Road
1958	Aiers, Mrs. F.	6 Arnewood Court, West Cliff Road
1962	Allen, Mrs. A. W. S.	80 Bath Hill Court
1958	Allen, Mrs. F. C.	8 Twynham Road, Southbourne
1963	Allen, Miss M.	174 Holdenhurst Road
1960	Alsford, C.	Long Field, Church Road, Ferndown
1960	Alsford, Mrs. J. R.	,, ,,
1955	Ambler, Mrs. A.	3 Little Forest Road, Talbot Woods
1965	Andrews, Miss K. E.	14 Frances Road
1963	Archer, Mrs. H. M.	4 Barclay Mansions, St. Valerie Road
1967	Arnold, Mrs. M.	1198 Christchurch Road, Boscombe
1950	*Bailey, Mrs. A. A.	4 East Avenue
1955	Bailey, Miss F. E. L.	57 St. Catherine's Road, Southbourne
1955	Bailey, Miss G. L.	,, ,,
1964	Balch, Miss M. M., M.B.E., B.A	Flat 3, 37 Queen's Park South Drive
1962	Balfour-Browne, Miss E. F.	Acorn Cottage, Station Road, Verwood
1957	Baly, Miss O. M.	70 Brackendale Road
1966	Band, J., M.P.S.	5 Boscombe Cliff Road
1966	Band, Mrs. M., M.A.	,,
1966	aBand, Miss E. M.	,,
1967	Banks, Sqd.-Ldr. J. L. C.	Kingston, Dene Walk, Ferndown
1968	Barnes, F. W.	10 Manor Road, Christchurch
1967	Barnett, Mrs. C. N.	2 "Anstey Cove," 3 Dover Road, Branksome Park
1965	Bates, A. D.	8 Southlea Avenue, Southbourne
1964	Bates, Mrs. G. E.	29 Lascelles Road
1968	Beer, Miss J. L.	2 Dale House, Wharfdale Road
1944	Bell, T. M., B.A., M.B., B.Ch.	5a Stourwood Avenue, Southbourne
1941	Bell, Mrs. R. M.	,, ,,
1966	Bennett, Mrs. J. K. M.	Flat 21, Eagle Hurst, Eagle Road, Branksome, Poole
1963	Bennetts, Miss K. M.	Flat 29, Belle Vue Gardens, Belle Vue Road, Southbourne
1947	Berrill, Miss M. E.	41a Cavendish Road
1965	Best, A.	"Broadview", Southbourne Coast Road
1967	Bettell, Miss I. M.	4 Curzon Court, Portarlington Road
1966	Bidder, E. R.	Bourne Hall Hotel, Westbourne
1965	Bircumshaw, Mrs. I. M., B.SC.	Flat 116, Albany, Manor Road
1946	Blackmore, H. C., L.D.S., R.C.S.	17 Ferry Road, Southbourne
1946	Blackmore, Mrs. E. E.	,, ,,
1968	Blick, L. W., C.Eng., M.I.E.E.	Cleve Court Hotel, Knyveton Road
1964	Blower, Miss M.	105 Ringwood Road, Verwood
1960	Boite, E. E. G.	17 Browning Avenue, Boscombe Manor
1966	Booth, Miss J. M.	41 Cedar Avenue, Christchurch
1957	Booth, Mrs. L.	,, ,,
1966	Boston, Miss S. S.	Linkfield Court Hotel, 19 Knyveton Road
1967	Bowers, Mrs. M. P.	2 Wootton Court, Wootton Mount

1956	Brain, Miss C. M.	16 Knole Road
1964	Brewer, Mrs. R. L.	39 Hengistbury Road
1967	Brown, H. G.	3 Blake Hill Avenue, Parkstone
1966	Brown, Miss R. W., B.A.	11 St. Winifred's Court, 3 St. Winifred's Road
1967	Brown, S. C. S., F.D.S., R.C.S., F.R.E.	158 Harewood Avenue, Queen's Park
1962	Brown, Miss V. C.	4 St. Winifred's Road
1951	wBull, A. W. M., C.B.	Broom House, Chiltern Road, Hitchin
1964	Burroughs, Miss I. K.	14 Richmond Park Avenue
1966	Burrows, Miss E.	Cottonwood, Grove Road
1930	Bury, Miss G. J.	4 Berne Court, Grove Road
1946	Busby, Miss A. G.	Flat 4, 77 Haven Road, Canford Cliffs
1952	†vButcher, A. J., F.R.I.B.A.	"Hilton", Dudsbury Avenue, Ferndown
1957	Butler, G. W.	Old Park Farm, Lytchett Matravers
1957	Butler, Mrs.	,, ,,
1967	Cady, Mrs. L.	108 Alexandra Road, Parkstone
1928	LCalkin, J. B., M.A., F.S.A.	Virginia House, Langton Matravers
1967	Cannon, Miss J.	63 Edmondsham House, Terrace Road
1967	Carsbury, W. H., C.Eng., M.I.E.E.	West Drive, Ballards Close, Lytchett Matravers
1967	Carsbury, Mrs. M.	,, ,,
1964	Cartwright, Miss D. E., M.B.E.	31 Wistaria House, Redhill Drive
1965	Casstles, Miss P.	2 Arishmel, 1 Powell Road, Parkstone
1967	Chalmers, Mrs. E. W., M.A.	5 Headswell Crescent
1943*	†vChambers, E., F.L.S.	Sandykeld, Manor Road
1950	Chambers, Mrs. E.	,, ,,
1959	Charter, A.	Flat 3, 1 Cavendish Place
1959	Charter, Mrs. E. E.	,, ,,
1965	Chick, W. L.	28 Albion Road, Christchurch
1945	Child, Miss L. M.	31a Southbourne Road
1912	L*Chilver, Miss K. M.	c/o 23 Wimborne Road
1951	Chomé, E. E. P.	6 Alyth Road
1942	Chomé, Mrs. W.	,,
1950	Churches, Mrs. E. W., M.B., Ch.B.	The White House, Colebrook Street, Winchester
1962	Clark, Mrs. F. M.	12 Alum Chine Road
1958	Clarke, Miss A. M., B.A.	71 Southbourne Road
1945	Clarke, Mrs. M.	4 Gardens Court, Parkstone Road, Poole
1927	*Clay, R. C. C., M.D., F.S.A.	The Manor House, Fovant, Wilts
1967	Clifton, Mrs. F. A., D.P.H.	3 Tutton Lodge, Stanpit, Christchurch
1963	Clode, J. C.	11 Oakley Road, Wimborne
1966	Coates, J. E.	21 Woodside Road, Ferndown
1966	Coates, Mrs. D. M.	,, ,,
1958	Cocke, M. H.	18a Penn Hill Avenue, Parkstone
1961	Coe, Mrs. G.	26b Cavendish Road
1966	Colmer, Mrs. M.	Kelverstone Court Hotel, Manor Road
1967	Connell, J. R., A.I.B.	1 Ken Road, Southbourne
1941	LCooper, Mrs. E. M.	125 Queen's Park Avenue
1951	LCooper, Miss R. I.	,, ,,
1945	Cooper-Hunt, Mrs. E. G.	40 Marine Drive East, Barton-on-Sea
1965	Cornell, Mrs. N. J.	1 Overcliffe Mansions, Manor Road
1952	Corser, Miss G. M.	3 Aspen House, Elm Grove Place, Salisbury, Wilts.
1967	Coward, Miss M. B.	31 Belle Vue Crescent, Southbourne
1948	Cox, Mrs. E. D.	248 Castle Lane
1956	Cox, Miss M. G. E.	7 Chessington Ct., Durley Chine Road
1962	Cragg, Miss M. A.	Bourne Hall Hotel, Westbourne
1967	Cramb, Mrs. K. E.	c/o Paull & Williamson's, 6 Union Row, Aberdeen
1962	Critchley, Mrs. M. M.	2a New Street, Ringwood, Hants.
1966	Cromey-Hawke, Mrs. D.	38 Elgin Road, Talbot Woods
1965	Curry, Miss S.	20 Stourwood Road, Southbourne

1903	*oCurtis, W. Parkinson, F.R.E.S. F.Z.S.	2 The Close, Westminster Road, Branksome Park
1959	Cutland, W.	Flat 11, Guy's Close, Addison Square, Ringwood, Hants.
1959	Cutland, Mrs. H. M.	,, ,,
1960	Dalrymple-Watt, Lady G. V.	1 Berwick Road, Talbot Woods
1965	ADando, M. S.	22 Ravine Road, Boscombe
1967	ADavies, O. P.	7 Hillcrest Close, Moordown
1964	Day, Mrs. A.	15 Bosley Way, Christchurch
1967	Deacon, Miss M. G. K.	42 Belmont Road, Parkstone
1966	ADecalmer, P. B. S.	21b Meyrick Park Crescent
1930	*de Castro, H.	72 Springdale Avenue, Broadstone
1935	Derry, Mrs. H. E.	33 Belle Vue Crescent, Southbourne
1962	Dickson, A. A.	"Muskerry", 23 Sandy Lane, Upton
1961	Dixon, Sir Arthur, C.B., C.B.E., B.A.	Bourne Hall Hotel, Westbourne
1949	Dixon, Miss H. C.	Meyrick Grange Hotel, 50 Christchurch Road
1958	Domney, Miss M.	Flat 2, 77 Haven Road, Canford Cliffs
1960	Dool, Mrs. N. M.	55 East Howe Lane
1961	Draper, Mrs. G.	68 St. Alban's Avenue
1953	Dudley, D. J.	17 Widdicombe Avenue, Parkstone
1955	Dudley, Mrs. I.	,,
1967	Earl, Mrs. J. C.	158 York Road, Broadstone
1953	Eaton, Mrs. V. W.	12a Alum Chine Road, Westbourne
1956	Edmonds, Miss K. E.	74 Namu Road, Winton
1965	Edwards, Brig. A. B. D., C.B.E., M.C.	234 Burlington Hotel, Boscombe
1967	Eisner-Heublum, Dr. A., Ph.D.	117 West End Lane, N.W.6
1966	Elcock, Miss S. F.	62 Danesbury Avenue, Southbourne
1963	Elliott, Mrs. D.	85 South Road, Boscombe
1967	Evans, Lt.-Col. H. G.	10a Winnards Close, West Parley
1967	Evans, Mrs. E. M.	,, ,,
1955	†vExton, Miss F. M., B.A.	39 Branksome Wood Road
1960	Exton, Miss J. M.	,, ,,
1959	Falvury, P.	Alpine, Warren Road, Westbourne
1953	LFarwell, Mrs. S. M. A.	Latch Farm, Fairmile, Christchurch
1966	Faulkner, J. W. T.	Bourne Hall Hotel, Westbourne
1963	Field, A. J., M.C., B.SC., F.I.M.	85 Lower Blandford Road, Broadstone
1963	Field, Mrs. E., B.SC.	,, ,,
1965	Fildes, F. C.	32 Clifton Road, Parkstone
1965	Fildes, Mrs. E. M.	,, ,,
1951	†wFisher, J., M.A., F.L.S., F.Z.S.	The Old Rectory, Ashton, Northampton
1966	Fitch, Miss E. N.	Little Mead, Maxwell Road, Canford Cliffs
1965	Foley, Miss E.	27 The Chantry, Madeira Road
1954	Follett, Mrs. V.	Windward, Stevenson Crescent, Parkstone
1962	Foote, H. N., D.opt.	Park Walk, Shaftesbury, Dorset
1966	Fornells, Miss M.	84 Leeson Road, Queen's Park
1966	Foster, Mrs. A.	33 Tollard Court, West Hill Road
1963	Fox, Mrs. V.	1 Clifton Court, Heathcote Road, Boscombe
1963	Freeman, Miss R. C.	10 St. Augustin's Road
1960	Gahan, Mrs. M.	215 Holdenhurst Road
1957	Galbraith, Mrs. A.	5 Lyndwood Court, Drysgot Road, Radyn, nr. Cardiff
1956	Gandy, Mrs. L.	11 Cranleigh Gardens, Southbourne
1955	Gardiner, P. C., F.R.I.C., C.Eng., M.I.Chem.E., M.Inst.Gas.E.	61 Ophir Road
1951	Goddard, Miss E. F.	215 Holdenhurst Road
1963	Goldie, Mrs. C. D. M.	20 Balcombe Road, Branksome Park

1959	Gompel, M. E., B.Sc.	12 Chigwell Road
1937	Gompel, Mrs. M. K.	"
1960	Good, Prof. R., M.A., Sc.D.	8 Durlston Road, Parkstone
1960	Good, Mrs. P. G.	" "
1949	Goodhart, Mrs. M. S.	West Thorpe, Lymington
1956	Goodman, Miss J. R.	4 Pinewood Road, Branksome Park
1965	Goodyear, K. G., F.R.E.S.	26 Twynham Avenue, Christchurch
1963	Graham, Miss C.	1 Horsa Close, Horsa Road
1965	Grange-Bennett, Mrs. M.	6 Brudenell Avenue, Poole
1960	Grattan, Miss L. T.	Solent Cliffs Hotel, West Cliff
1953	Gray, Miss E.	44 Edmondsham House, Terrace Road
1967	Green, Mrs. E. I., B.A.	4 Baring Road, Southbourne
1956	Green, Miss G. M., B.A., LèsL.	17 Clifton Road, Parkstone
1967	Greenwood, Mrs. K. M. R.	12 Kingsgate, 7 The Avenue, Branksome Park
1967	Griffiths, H. D.	C23 San Remo Towers, Boscombe
1965	AGunn, J. P. N.	"Broomhill", Frogham, Fordingbridge
1956	Habershon, Miss E. M.	Leas Court, Cliff Drive, Canford Cliffs
1961	Haines, Miss E. S.	"Little Orchard", Godshill, Fordingbridge, Hants
1951	Haines, Miss G. M.	Appleslade, Linwood, Ringwood
1951	Haines, Miss R. M.	" "
1962	Hall, Mrs. E., B.Sc.	16 Beresford Road, West Southbourne
1953	Hancock, Mrs. C. E.	912 Castle Lane East, Iford
1959	Hannam, B., M.P.S.	16 Hazelwood Avenue, New Milton
1959	Hannam, Mrs. W.	" "
1959	Hards, Mrs. D. K.	30 Dean Park Road
1960	Hardy, Miss L. H.	20 The Grove, Redhill Park
1955	*vHarris, H. V.	15 St. Winifred's Court, St. Winifred's Rd.
1958	Harris, Mrs. W. I.	" "
1958	Hart, Miss C. L., S.R.N.	The Thatched Cottage East, Godwin's Croft, Bransgore, Hants
1961	Harvey, Mrs. F. E., M.B., Ch.B.	C21, San Remo Towers, Boscombe
1959	Harvey, Miss G. E. J.	37 Redhill Court, Wimborne Road, Moordown
1964	Hatton, R. H. S., M.A.	The Small House, Llangennith, Glam.
1951	Hawker, Mrs. E.	64 Alumhurst Road
1951	Hayman, Miss M. S.	39 Queen's Park South Drive
1956	Heath, Mrs. C. J.	Keverstone Court Hotel, Manor Road
1954	Hermon, J. A.	43 Stourcliffe Avenue. Southbourne
1967	Hill, Mrs. L. M.	23 St. Leonard's Road
1965	Hind, A. E.	68 Guest Road, Branksome, Poole
1956	Hinton, Miss E. M.	1 Lonsdale Road
1962	Hipperson, Miss M.	69 Headswell Avenue
1962	Hodson, Prof. F., Ph.D., F.G.S.	Geology Dept., University of Southampton
1960	Holbrook, H. S., B.Sc., C.Eng., F.I.E.E.	5 Staunton House, Exeter Park Road
1963	Holbrook, Mrs. M. E.	" " "
1962	Holmes, Mrs. N. E. F.	7 St. John's Road, Boscombe
1952	Holroyd, G.	4 Beechey Road
1966	Holt, Miss C.	83 Stanpit, Christchurch
1961	Hooton-Smith, E. W.	36 Wellington Road
1961	Hooton-Smith, Mrs. B. E.	"
1967	Hopkins, Miss C. M.	St. Hugh's College, Oxford
1967	Horne, Miss E., M.A.	4 Rowena Road, Southbourne
1968	Hulme, Miss D.	D11, Pine Grange, Bath Road
1957	Hunt, W. H.	Flat 1, 5 Alton Road, Parkstone
1954	†vHunt, Mrs. A. K., B.Sc.	" "
1952	Imlach, Mrs. M. G., B.A.	2 Redcotts, Wimborne, Dorset
1933	James, Mrs. M. G.	70 St. Alban's Avenue
1960	James, W. H.	19 Donnelly Road, Southbourne
1945	Jenkins, Miss P.	Galltfaenan, Trefnant, Denbigh

1966	Jepps, Miss M. A.	2/13 Ascham Road
1962	Jones, Miss O. E. C., S.R.N.	86 Hoburne Farm Park, Christchurch

1928	Kendall, Miss G. J., A.R.C.M.	62 Churchfield, Poole
1968	Kent, F., M.R.C.S., L.R.C.P.	9 Geneva Avenue, Southbourne
1963	Kenworthy, Mrs. J. S. G.	8 Ripon Road, Winton
1967	Kneller, Mrs. H. E.	Flat 3, Pennington House, Grosvenor Road
1965	Kilby, Miss M.	15 Southlands Avenue, Corfe Mullen
1965	Killick, Mrs. K. D.	4 Highlands Road, Barton-on-Sea
1967	King, Mrs. M. V. B.	66 Albany, Manor Road

1968	Laberge, Mrs. W. A., B.A.	10 Radcliffe Court, Manor Road
1965	Lamb, Miss J. P., S.R.N.	121 Sheringham Road, Branksome
1964	Lambert, F. H., A.R.I.B.A.	50 Hillside Drive, Christchurch
1964	Lambert, Mrs. D. M.	,, ,,
1965	Lambert, Mrs. V. L.	School House, School Lane, Ringwood
1967	Lansley, F. S., B.SC.	33 William Road, Queen's Park
1967	Lansley, Mrs. G. E., S.R.N.	,, ,,
1959	Lawes, A. V.	48 Seafield Road, Southbourne
1962	Leake, Mrs. I. B.	21 Langside Avenue, Parkstone
1966	Leck, Miss W. A.	5 Heathwood Road
1966	Lee, W. H.	18 Ravenshall, West Cliff Road
1967	Lee, Mrs. L. B.	,, ,,
1966	Legge, Mrs. I.	E13, San Remo Towers, Boscombe
1948	Leonard, Mrs. N.	1 Neville Court, Derby Road
1957	Le Roy, Miss E. S. H.	Forest Mead, Tyrell's Ride, Burley, Hants
1957	Le Roy, Miss M. C. G.	,, ,,
1958	Le Sueur, Mrs. D. G.	49 Wellington Road
1965	Lever, Mrs. M. E.	54 Hoburne Farm Park, Christchurch
1961	Lewis, Miss D. M.	137 Burlington Hotel, Boscombe
1966	Lewis, Miss S.	31 Greenways, Highcliffe-on-Sea
1951	Lloyd, G. B., B.A.	58 Glenferness Avenue
1950	Locke, Mrs. J. B. E., B.A.	85 Seafield Road, Southbourne
1947	Logan, Miss A.	3 Grosvenor Court, Vale Road
1951	wLowe, Mrs. D. M.	43 Marryat Road, Wimbledon, S.W.19
1934	†vLowther, Miss D. M., B.SC.	Lonsdale, 15 Mayfield Avenue, Parkstone
1967	Ludgate, H. C.	12 Lakeside Road, Branksome Park

1956	McClay, H.	64 Blake Dene Road, Lilliput
1965	MacDonald. C. M.	15 Dingle Road, Southbourne
1963	MacKeith, Miss M. R., B.SC.	13 Addis Square, Southampton
1956	Maddox, Mrs. L. M.	31 Egerton Road, Queen's Park
1959	Mariette, Miss G. A.	4 Mansfield Avenue, Parkstone
1946	Marshall, Miss D. H.	76 Palace View, Bromley, Kent
1954	Marshallsay, Miss E. N.	Derby Hall Hotel, 24 Knyveton Road
1967	Martin, F. B., F.C.I.I.	C25, San Remo Towers, Boscombe
1965	Martyn, Mrs. D. M.	15 Waverley Road
1964	Masters, Miss K. F.	10 West Way Close, West Way
1958	Mate, Mrs. F. M.	8 Clifton Road, Parkstone, Poole
1956	Middlemast, A. H.	86 Hengistbury Road, Southbourne
1956	Middlemast, Mrs. M.	,, ,,
1964	Middleton, W. J.	34 Compton Avenue, Parkstone
1965	Miles, L. L. H.	D41, San Remo Towers, Boscombe
1966	Millington, Mrs. C. S.	27 Ravenshall, West Cliff Road
1956	Mills, Miss N.	8 Herbert Road
1959	Mitton, J. C.	3 Gainsborough Road
1957	Moore, W.	139 Alder Road, Parkstone
1962	Moore, Mrs. J.	139 Alder Road, Parkstone
1965	Morgan, A. E.	c/o 1 Overcliffe Mansions, Manor Road
1959	Morgan, Commander S. T., O.B.E., R.N. (Retd.)	Bracken Cottage, Blissford, Fordingbridge, Hants
1959	Morgan, Mrs. V.	,, ,,
1964	Morton, Miss E. M. W.	21 Pinebeach Court, Canford Cliffs

1963	Moss, F. W.	39 Hengistbury Road, Southbourne
1963	Moss, Mrs. D. M.	,, ,,
1962	Mott, Miss J. H.	2 Warren Avenue, Mudeford, Hants.
1966	Munns, Miss N. W., B.SC.	28 Crescent Court, Chine Crescent
1965	Murch, Mrs. O. E.	4 Highlands Road, Barton-on-Sea

1960	Nelson, A., F.C.A.	65 Alyth Road, Talbot Woods
1963	Newton, Mrs. K. F.	Rose Hill Hotel, MacAndrew Road, Canford Cliffs
1967	Nicklen, Mrs. L. V.	77 Holdenhurst Avenue

1957	Odell, Mrs. G. B.	Cottonwood Hotel, East Cliff
1956	Odlum, Miss D., M.A., M.R.C.S., L.R.C.P., D.P.H.	11 Cliff Drive, Canford Cliffs
1964	Odom, Miss E. V., M.A.	18 Church Road, Southbourne
1929	Ogden, Miss E.	1 Rossini Cottage, Hedgemead, Bath
1948	Ogden, F.	Cottonwood Hotel, East Overcliff Drive
1950	Ogle, Miss U. M.	2 Frankland Crescent, Parkstone
1965	Oliver, Miss D. K.	35 Boscombe Spa Road

1958	Page, W. E., M.A.	53 Petersfield Road, Boscombe East
1945	Paris, Lt.-Col. A., R.E. (Retd.)	11 Stourwood Road, Southbourne
1956	Paris, Mrs. G.	,, ,,
1967	Parmenter, L., F.R.E.S.	Woodside, Pinewood Road, Ferndown
1963	Payne, Miss H. I.	83 St. Luke's Road
1916	*LPenrose, Miss F.	Little Picket, Hightown, Ringwood
1916	*LV†Penrose, Miss M., B.SC.	,, ,,
1948	Perceval, Mrs. W.	7 Benellen Avenue
1963	Perry, W. F., B.SC.	117 Portland Road
1961	Pesterfield, Miss M.	56 Gresham Road
1950	†Peters, Sir R. A., M.C., M.A., M.D., F.R.S.	3 Newnham Walk, Cambridge
1953	Pickering, V. T.	Francesca, Hightown, Ringwood, Hants
1953	Pickering, Mrs. C. G.	,, ,,
1959	Pierce, Mrs. E. K.	4 Mansfield Avenue, Parkstone
1959	Piper, P. J., F.R.I.C.S.	18 Mayfair, West Cliff Road
1959	Piper, Mrs. M. G.	,, ,,
1966	Pither, C. M., F.R.A.S., F.I.L.S.	86 Canberra Road, Christchurch
1966	Poole, Mrs. I.	23 Spur Hill Avenue, Parkstone
1955	Porter, Miss D. A.	23 Christchurch Road
1957	Powis, Mrs. M E.	37 Wheaton Road, Pokesdown
1965	Preston, Mrs. T. A.	11 Nairn Court, 12 Nairn Road
1967	Prideaux, Miss C.	28 Ravine Road, Canford Cliffs
1964	Prince, Miss E. M., S.R.N.	4 St. James Sq., New Mills, Nr. Stockport
1967	Purdy, Mrs. K. M.	158 York Road, Broadstone

1945	*†VRead, W. J., M.SC., F.R.I.C.	15 Carbery Avenue, Southbourne
1951	Read, Mrs. H. A.	,, ,,
1957	Reakes, Rev. G. S., B.A.	The Cottage, 7 The Avenue, Branksome Park
1957	Reakes, Mrs. K. A.	,, ,,
1967	Reid, D. G., B.A.	Ely House Hotel, 79 Lansdowne Road
1942	Richards, Miss M. C.	Stour Lodge, 21 Julian's Road, Wimborne
1967	Richardson, Miss A. K.	31 Pinewood Road, Branksome Park
1966	Robbins, Miss R., M.SC.	52 Burton Court, Chelsea, S.W.3
1949	Robertson, Mrs. M.	41 Christchurch Road
1954	Robertson, Miss V. L.	48 Crag Head, Manor Road
1966	Rollin, Miss P. E.	35a Holdenhurst Avenue, Boscombe
1964	Rose, Mrs. D., M.A.	5 East Avenue, Talbot Woods
1967	Rosemond, S. J., F.I.L.	64 Colman Court, Manor Road
1963	Rossiter, Mrs. D. M.	5 Park Homer Road, Colehill, Wimborne
1959	Rowe, Miss F.	23 Stourcliffe Avenue, Southbourne
1963	Rushton, Miss K. M., M.SC., M.B., Ch.B.	20 Greenways, Highcliffe
1967	Rushton, W.	,, ,,
1967	Russell-Cotes Art Gallery	East Cliff

1965	Ryde, K. A.	95 Barton Court Avenue, Barton-on-Sea
1965	Ryde, Mrs. M. K.	,, ,,
1951	wSalisbury, Sir E., D.SC., F.R.S., F.L.S.	Croindene, Strandway, Felpham, Bognor Regis, Sussex
1954	Saunders, Miss W. A.	11 Portman Crescent, Boscombe
1967	Screeton, Miss G. M.	B6, Exbourne Manor, 37 Christchurch Road
1938	Seare, Mrs. S. F. E.	Almer, Blandford
1960	Sephton, Mrs. N., M.B., Ch.B.	Flat 1, 4 Talbot Avenue
1951	Sewell, Mrs. I.	4 Maundeville Crescent, Christchurch
1941	Sexton, Miss F.	60 Uplands Road
1966	Shelton, Miss V. A.	112 Lowther Road
1950	Shillidy, G. A., C.I.E.	Flat 10, 31 St. Peter's Road
1937	Simmons, Mrs. I. M.	73 Spur Hill Avenue, Parkstone, Poole
1963	Simpson, Mrs. C.	Flat 46, Sunningdale, 28 Braidley Road
1966	Simpson, Mrs. D.	15 Gadbridge Court, West Cliff Road
1920	Simpson, N. D., M.A., F.L.S., F.R.M.S.	3 Cavendish Road
1961	Sims, Mrs. M. M. E.	22 Duncliff Road, Southbourne
1959	Slater, G. A.	58 Wentworth Avenue, Southbourne
1959	Slater, Mrs. E. M.	,, ,,
1963	Slater, Miss M. A.	,, ,,
1959	Slieker, Miss H. R. M.	133 Seafield Road, Southbourne
1963	Smith, D. V. H., C.Eng., M.I.Mech.E., M.I.H.V.E.	17 Little Forest Road, Talbot Woods
1965	Smith, Miss G. M.	c/o Lloyds Bank, 45 Ealing Broadway, W.5.
1959	Soar, Miss I. M.	11 Grosvenor Road
1962	Sparks, Miss A.	47 Joanna Close, Downton, Salisbury
1962	Sparks, Miss M.	,, ,,
1967	Spencer, S. R.	Foxholes, Golf Links Road, Ferndown
1965	Staples, E. G., M.A.	7 Easter Court, 31 St. John's Road, Boscombe
1962	Stiff, Miss F. A.	19 Heathwood Road, Winton
1962	Still, D. C., F.S.M.C., D.Opt.	56 Highfield Road, Moordown
1966	Storr, Mrs. W. W.	4 Moonraker's Way, Highcliffe, Hants.
1967	Strain, W. S., M.A.	65 Farm Lane North, Barton-on-Sea
1967	Strain, Miss A. W.	,, ,,
1956	Stray, J. F.	Browngates, Barton Lane, Barton-on-Sea
1957	Stray, Mrs. S. V. M.	,, ,,
1960	Sunderland, Mrs. R. B.	18 Spur Hill Avenue, Parkstone
1967	Swann, Miss R. F. S.	9 Coy Pond Road, Branksome
1950	Sworder, Miss R.	c/o Barclay's Bank Ltd., 659 Christchurch Road, Boscombe
1962	Tarrant-Willis, F. E.	52 St. Osmund's Road, Parkstone
1955	Taylor, Mrs. B.	164 Belle Vue Road, Southbourne
1967	Teasdill, G., F.M.A., F.R.S.A., F.R.N.S., F.Z.S.	99 Carbery Avenue, Southbourne
1967	Teasdill, Mrs. N. A.	,, ,,
1966	Thomas, J. G.	5 Pine Mansions, Vale Road
1966	Thomas, Mrs. C.	,, ,,
1965	Thomas, W. C.	Oriens, Dilly Lane, Barton-on-Sea
1965	Thomas, Mrs. G. M., M.A., B.Litt.	,, ,,
1964	Thorne, Mrs. M., B.A.	St. John's Vicarage, 1 Brunstead Place, Branksome
1966	Till, N. W. L.	165 Manor Road, Verwood
1966	Till, Mrs. A. M. E.	,, ,,
1968	Tinney, Mrs. W. M.	6 Beach Cliff, 3 Burnaby Road
1965	Todd, Miss E. Crichton	36 Alumhurst Road, Westbourne
1966	Tozer, Miss D.	10 Clarendon Road
1961	Turnbull, A.	40 Southern Road, West Southbourne
1949	*Turner, G. A.	4b Wimborne Road

1959	Tyler, E. F.	43 Brackendale Road
1966	Tyler, Miss L. I.	"
1950	Venning, Brig. F. E. W., C.B., C.B.E., D.S.O., M.B.O.U.	Pinewood, Butts Ash, Hythe
1961	Waldy, Mrs. V. M.	The Paddocks, Dover Road, Branksome Park
1967	Walker, Miss G., M.B., Ch.B., D.P.H., B.SC.	E16, San Remo Towers, Boscombe
1966	Walker, H. G., LL.B,	Hordle Dene, Hordle, Lymington
1955	Walker, Mrs. L. W.	12 Fernbank, St. Stephen's Road
1961	Wallace, Miss J. B., B.SC. (ECON.)	10 St. Ives Park, Ringwood, Hants.
1961	Wallis, Miss M. E.	2 Warren Avenue, Mudeford, Christchurch
1965	AWarn, R. M.	1a Warren Edge Road, Southbourne
1946	Watts, Miss N. E.	26b Cavendish Road
1947	West, Miss G. M.	The Knapp, Studland, Dorset
1961	Weston, Miss S. A.	Flat 2, Earlston, 8 Portarlington Road
1924	Whitaker, Miss E. M.	22 Somerset Road, Boscombe
1924	Whitaker, S. E., A.R.I.C.S.	22 Selwood Road, Addiscombe, Croydon
1962	White, Mrs. A. W.	39 Belle Vue Gardens, Belle Vue Road, Southbourne
1963	White, Miss D. L. M.	23 Pinewood Road, Branksome Park
1963	White, Miss J.	" "
1967	Wilks, Miss A. E. M.	3 Shorefield Way, Milford-on-Sea
1966	Wilson, Mrs. E. A. M.	23 Glenferness Avenue, Talbot Woods
1963	Winser, Miss M. M.	3 Mount Blairy, 23 St. Winifred's Road
1956	Wise, Mrs. B.	55 Namu Road, Winton
1960	Withers, A. E., F.A.I.	E41, San Remo Towers, Boscombe
1960	Withers, Mrs. D. E.	" "
1948	AWood, Miss E. B., B.SC.	4 New Park Road, West Southbourne
1958	Wood, F. J.	17 Montague Road
1956	Wood, T. E., M.A., LL.B.	21 Durley Chine Road
1953	Wootton, Miss E. M.	564 Holdenhurst Road
1967	Workers' Educational Assoc.	2 Wolverley Court, 31 Marlborough Road (Hon. Sec.)
1949	†vWray, D. A., M.SC., Ph.D., F.G.S.	42 Canford Cliffs Road
1956	Wray, Miss J., S.R.N.	" "
1946	Wycherley, Mrs. L.	11 Hayes Avenue, Queen's Park
1965	Yorke, Mrs. N. M.	15 Dingle Road, West Southbourne
1964	Young, Miss A. M., L.L.A.	6 Salisbury Road, Boscombe
1967	Young, Mrs. V.	" "
1967	Young, Mrs. G.	3 South Court, Milford-on-Sea
1958	Yule, Mrs. M. P.	89 Orchard Avenue, Parkstone

AFFILIATIONS

The Society subscribes to the following organizations:— National Trust, Botanical Society of the British Isles, Council for British Archaeology, Council for British Ornithology, Hampshire and Isle of Wight Naturalists' Trust, Dorset Naturalists' Trust, South-Eeastern Area Museum Service. The Society is affiliated to The British Association for the Advancement of Science.

BOURNEMOUTH NATURAL SCIENCE SOCIETY

Summary of the Accounts for the year ended September 30th, 1967

1965/6 £	s.	d.	Receipts	£	s.	d.	£	s.	d.
604	*10*	*0*	Subs to Sept. 30th, 1967	705	1	0			
67	*10*	*3*	Covenant Tax refunds ...	93	15	8			
							798	16	8
			Rents, etc.						
259	*11*	*8*	Royal Commonwealth Society	263	17	2			
100	*0*	*0*	Camera Club	100	0	0			
—	—	—	Dark Room	2	5	3			
							366	2	5
20	*9*	*0*	Royal Commonwealth Society, gas refunds ...	21	1	8			
8	*15*	*9*	Telephone call box ...	5	10	3			
—	—	—	S.E.T. repayments ...	24	7	6			
5	*0*	*0*	Projector fees	6	5	0			
11	*16*	*6*	Sundries	22	0	0			
							79	4	5
51	*16*	*2*	Field Meetings refunds	40	0	0			
38	*0*	*6*	Garden Party (net) ...	37	4	0			
10	*2*	*0*	New Year Party (net) ...	6	6	9			
15	*3*	*3*	Teas (net)	16	17	6			
							100	8	3
255	*14*	*0*	Interest on Investments	307	15	3			
164	*5*	*7*	Income Tax refunds, interest	183	19	2			
							491	14	5
			Total of Ordinary Receipts				1836	6	2

1965/6 £	s.	d.	Payments	£	s.	d.	£	s.	d.
137	*16*	*3*	Caretaker (Wages, Insurance and S.E.T. ...	170	18	5			
88	*3*	*3*	Insurance	114	9	2			
385	*17*	*11*	Maintenance	319	16	0			
357	*2*	*5*	Rates	254	5	1			
							859	8	8
—	—	—	Coal (two years) ...	49	17	6			
140	*5*	*5*	Gas	143	7	10			
125	*11*	*0*	Electricity	126	16	2			
12	*6*	*6*	Water	12	15	8			
							332	17	2
134	*3*	*3*	Printing and Stationery	126	17	10			
89	*15*	*0*	Proceedings	107	0	0			
34	*0*	*6*	Telephone	35	13	6			
61	*11*	*7*	Postages	56	17	11			
							326	9	3
90	*0*	*0*	Garden	90	0	0			
15	*1*	*7*	Library	12	13	11			
							102	13	11
18	*0*	*0*	Subscriptions to other Societies	17	15	0			
16	*18*	*3*	Sundry payments ...	23	0	5			
							40	15	5
			Total of Ordinary Expenses				1662	4	5

	Receipts other than Ordinary		
80 14 0	Donations		151 0 0
	Legacy from the late Miss Emma Lowde ...		25 0 0
	Transferred from Deposit Account		710 0 0
	Repayment of Bournemouth Corporation Mortgage		200 0 0
	Balance at Bank, 30.9.66	36 10 9	
	Cash in hand	16 6	
			37 7 3
			£2959 13 5

Payments other than Ordinary		
Purchase of Wycombe R.D.C. Mortgage ...		500 0 0
Transferred to Deposit Account		677 0 0
Balance at Bank 30.9.67	50 10 11	
Cheques in hand ...	69 11 6	
Cash in hand	6 7	
		120 9 0
		£2959 13 5

We have examined the above Accounts with the Books of the Society and Vouchers for payments, and certify the same to be correct.

ALBERT V. LAWES }
A. H. MIDDLEMAST } Auditors

F. J. WOOD, Hon. Treasurer.

DEPOSIT ACCOUNT

	£	s.	d.		£	s.	d.
Balance at Bank 30.9.66	563	1	4	Balance of Deposit at Bank, 30.9.67	552	3	0
December 31st, 1966 interest	22	1	8	Transferred to Current Account	710	0	0
Transferred from Current Account	677	0	0				
	£1262	3	0		£1262	3	0

CINE ACCOUNT

	£	s.	d.		£	s.	d.
Balance in hand, 30.9.66	40	5	0	Hire of Films	19	15	0
Subscriptions	27	0	0	Postages and Stationery		7	11
				Maintenance of Apparatus		4	8
				Balance in hand, 30.9.67	46	17	5
	£67	5	0		£67	5	0

LIBRARY ACCOUNT

	£	s.	d.		£	s.	d.
Balance at Bank and in hand, 30.9.66	73	5	8	Library Expenses	14	11	2
From Hon. Treas., refund of 1965-66 Library Expenses	12	13	11	Library Maintenance	22	13	3
Sale of Books and Periodicals	50	7	6	Balance at Bank and in hand, 30.9.67	99	2	8
	£136	7	1		£136	7	1

FIELD MEETINGS ACCOUNT

	£	s.	d.		£	s.	d.
Cash in hand, 30.9.66	23	12	2	Expenses Field Meetings	11	18	10
Surplus from Coaches	42	12	1	Transferred to General Account	40	0	0
				Cash in hand, 30.9.67	14	5	5
	£66	4	3		£66	4	3

GARDEN ACCOUNT

	£	s.	d.		£	s.	d.
Balance brought forward, 30.9.66	3	3	4	Gardener	69	0	0
Per Treasurer	90	0	0	Shrubs	1	2	6
				Sundries	2	11	6
				Balance in hand, 30.9.67	20	9	4
	£93	3	4		£93	3	4

INVESTMENTS

		Cost			Value 30th Sept., 1967		
		£	s.	d.	£	s.	d.
£1000	British Transport 3% 1978/1988	775	4	0	584	0	0
£2000	County Borough of Bournemouth Mortgage Bond 5½% 1968	2000	0	0	2000	0	0
£ 500	County Borough of Bournemouth Mortgage Bond 6% 1969	500	0	0	500	0	0
£1500	Consolidated Stock 4%	979	0	0	873	0	0
£1200	British Electricity Stock 4¼% 1974-1979	984	4	0	937	10	0
£ 600	Exeter Corporation Loan 6¾% 1971	600	0	0	600	0	0
£ 500	Borough of Swindon Mortgage Loan 6½% 1970 ...	500	0	0	500	0	0
£1600	Manchester Corporation Bond 6¾% 1972 ...	1600	0	0	1600	0	0
£ 500	Wycombe Rural District Council Mortgage Loan 7¼% 1972	500	0	0	500	0	0
		£8438	8	0	£8094	10	0

Report of the Council for the Year ending 30th September, 1967

This year the Council has returned in these Proceedings to a former style of presentation. While recent Volumes enabled certain events of the year to be highlighted they did less than justice to the extent of the Society's activities. A complete list of the year's official programme is therefore annexed to this report.

The Council looks back on a year of considerable interest and achievement and wishes to record its grateful thanks to (a) the Chairmen of Sections for providing such wealth of lectures, field meetings etc.—indeed the work of these Chairmen constitutes the life blood of the Society, (b) the many lecturers from both within and without the Society and the leaders of field meetings who have given us so much pleasure and instruction, (c) the host of members who have in so many ways contributed to the running of the Society and the comfort of members, and (d) those who represent us on kindred societies.

The Council would also like to express appreciation of the number of donors and testators (some of the former anonymous) who have made gifts to the Society. Among the gifts in kind (which are not shown in the accounts) mention may be made of the piano given by Mr. and Mrs. Caisley on their leaving the district.

Membership on the 30th September was 429 (as against 434 last year) excluding 9 monthly members. The Council is very grateful to those who have assisted in arresting the decline in membership and hopes that this good work will be continued: it would be profitable from every point of view if membership could be increased to 500 or over.

The Council has often reminded members of the benefit accruing to the Society by their paying their subscriptions under a Deed of Covenant; the numbers doing so are increasing but greater advantage could still be taken of this procedure. Certain technical matters have to be watched when members enter into these covenants, but the Treasurer and Secretary are always ready to advise those who are prepared to consider the scheme, and to give all necessary information to enquirers.

This year the decision was taken to change from two-monthly to three-monthly programmes, and the system is now in operation.

Another major change in procedure is the proposal to enlarge the composition of the Council. In one sense the Council is perhaps already over large for a policy-making body, but it has been noticed that the elected members tend to become those holding some office in the Society (possibly because they have become better known to members generally) and, of course, their experience and knowledge are useful. This, however, means that too few are elected from the ranks of the non-official members. The proposal is designed, therefore, to bring more members from the "floor" on to the Council, which will be pleased to see some of our newer members elected, particularly those who would be willing in due time to take office in one capacity or another. The Society is always changing—some 50% of our members have joined since 1960—and we must have new blood to take over the responsibilities of running the Society as vacancies occur.

This year the Council has with great regret accepted the resignation of Mr. H. V. Harris from the chairmanship of the Ornithological Section—a post he has filled with enthusiasm and distinction for eleven years. His contribution to the Society in many directions has been immense and it is good to know that as a Vice-President, and therefore a member of Council, his advice will still be available to us. The Council extends a welcome to Squadron Leader J. L. C. Banks, Miss K. M. Bennetts and Mrs. L. M. Maddox who have taken over the Chairmanship of the Sections dealing with Insects, Mammals and Birds respectively.

Honorary Members have asterisks before their names in the List of Members. They are a small and distinguished company of men and women who have given long and devoted service to the Society. During the year the Council conferred this honour on Mr. E. Chambers, F.L.S., Mr. H. E. Clarke, M.A., B.SC., F.R.I.C., Mr. H. V. Harris, Mr. W. J. Read, M.SC., F.R.I.C., and Mr. W. P. Winter, B.SC.

The Society continues to take a considerable interest in other bodies to which it subscribes or with which it is affiliated, on some of which it is either directly or indirectly represented. During the year the Society gave its support to the Hampshire and Isle of Wight Naturalists' Trust in the action it is taking to try to preserve parts of the New Forest from no doubt well-intentioned but ill-conceived modernisation in the name of "planning".

The Council records with regret the deaths of the following Members (the figure in brackets is the year of joining):— Lt.-Col. M. J. Ambler (1956), Mr. H. E. Clarke, M.A., B.SC., F.R.I.C. (1945), Mrs. E. I. Day (1952), Mrs. C. A. N. Fergusson (1956), [redacted] Miss M. Kirke (1944), Mr. G. S. Locke (1950), Dr. E. C. Millington, M.SC., Ph.D. (1967), Mr. C. A. Moss (1955), Mrs. B. E. Osborne (1948), Mr. H. E. Piggott, O.B.E., M.A. (1960), Miss I. E. Sheffield (1933), Mr. B. Shorthouse (1944), Mr. J. W. Thomas (1959), Mrs. E. L. Venning (1950), Mrs. W. Boyd Watt, F.Z.S., M.B.O.U. (1941), Mr. W. P. Winter, B.SC. (1950), Mrs. H. A. Winter (1951), Mr. H. L. Witherby (1959), Miss M. L. Yeo (1965). The services to the Society over a long period of Miss Sheffield, Mrs. Boyd Watt, Mr. Winter and Mr. Clarke are recorded in Obituary Notices on pages 23 and 24. Other members who will be sorely missed are Mrs. Winter and Mr.G. S. Locke, both well known to a host of members past and present, who enjoyed their company on excursions and at lectures. Few members know that Mr. Locke spent a great number of hours at home and in our Reference Library on the unexciting task of compiling a valuable index of Council Minutes.

NOTE: This volume of the Proceedings is being issued two months later than the last. The illness of one of the main contributors held things up for some weeks. Further delay was caused by the wish of Council to record the sad news of the deaths of Mr. Winter and Mr. Clarke in the Obituary pages of this volume and not to wait nearly a year to pay them tribute and express our sense of loss.

Lectures, Field Meetings and Visits, 1966-67

Lectures open to the public free of charge are shown by the letter P *after the date. Degrees and other qualifications are inserted only after the first mention of names.*

The programme comprised 52 Lectures, 59 Excursions and Field Meetings, 12 Members' Days and 7 Cine Subscription Programmes, making a total of 130. The Annual General Meeting, 12 monthly Council Meetings, and regular meetings of Committees were held as usual.

GENERAL

	LECTURE	LECTURER
Oct. 8	—Presidential Address: The Mountains of East Africa and their Vegetation.	Mrs. A. K. Hunt, B.SC.
Dec. 3	—Angkor (Cambodia)	Michael Bentley
Jan. 7P	–Young Scientists of Talbot Heath: British Girls' Exploring Society Expedition to Arctic Norway. A Field Study Course at Kindrogen	 Judith Harrison Elizabeth Lamb
Feb. 22	—Scottish National Trust Cruise 1966	Miss M. Penrose, B.SC.
Aug. 23P	–Life in the New Forest. Colour film by Mrs. R. M. Bell. Commentary by T. M. Bell, B.A., M.B., B.Ch.	

	PLACE	LEADER
Oct. 20	Visit to the Red House Museum	Mrs. N. Sephton, M.B.,CH.B.
Mar. 20	—Visit to the Russell-Cotes and Rothesay Museums	,,
May 2 to 4	—Three-Day Field Meeting in the Isle of Wight	Miss F. M. Exton, B.A.
Sept. 28	—Rode Tropical Bird Gardens and American Museum, Claverton	Mrs. I. Poole Mrs. V. Follett

SECTIONS

Archaeology and History Chairman : Mrs. C. Simpson

	LECTURE	LECTURER
Oct. 26—	Our Building Inheritance: The Changing Scene in Hampshire	R. L. P. Jowitt
Nov. 26	The Lost Empires of America — Aztec, Maya, Inca.	E. Chambers, F.L.S.
Dec. 19p–	The Pyramids	F. C. Fildes
Jan. 25—	The Old Roads of Dorset	Prof. R. Good, M.A., SC.D.
Feb. 18—	The Story of Bristol	F. W. Moss
Apl. 20—	Egypt (XIXth Dynasty)	Mrs. C. Simpson
May 24p–	Prehistoric Man in Wiltshire	,,

	PLACE	LEADER
June 22—	Archaeological Tour of Wiltshire	Mrs. C. Simpson
Sept. 6—	Dunster Castle and Village	,,

Astronomy Chairman : C. M. Pither, F.R.A.S., F.I.L.S.

	LECTURE	LECTURER
Oct. 22p–	The Strange World of Mercury	C. H. Pither
Dec. 17—	The Winter Sky	,,
Feb. 25—	Astronomical Navigation	G. McClorry
Apl. 8p–	The Tools of the Astronomer	A. C. Curtis, F.R.A.S.

	PLACE	LEADER
Aug. 29—	The Royal Greenwich Observatory, Herstmonceux	C. M. Pither

Botany Chairman : Mrs. A. K. Hunt, B.SC.

	LECTURE	LECTURER
Nov. 23—	More Flower Photographs	Mrs. M. S. Goodhart
Jan. 18—	Diatoms : Their Structure, Life History and Uses.	N. I. Hendy, F.L.S.
Feb. 13p–	Problems of the Norfolk Broads	Dr. Joyce Lambert, B.SC.
Mar. 11	Some Wild Flowers of The Cape	W. S. Strain
July 5p–	History, Legend and Romance of Plant Names	E. Chambers

	PLACE	LEADER
Oct. 4—	Fungus Foray — New Forest	Mr. & Mrs. V. T. Pickering
Oct. 25—	Autumn Tints — New Forest	The Misses Penrose
Apl. 13—	Hinton Admiral (Courtesy of Sir Geo. Meyrick)	Mrs. I .Sewell and Miss E. M. Whitaker
Apl. 20—	The Bourne Valley in Spring (with Geography Section)	Mrs. A. K. Hunt, Miss F. M. Exton and Mrs. V. Goulton
Apl. 25—	Lytchett Matravers	Mrs. A. K. Hunt and M. H. Cocke
Apl. 29—	Pennington Common	Mrs. O. E. Murch and Mrs. K. D. Killick
May 8—	Dancing Ledge	Miss V. Follett and Mrs. I. Poole
May 17—	Sadborow Gardens, near Chard. (Courtesy Commander W. J. Eyre, R.N., Rtd.)	Mrs. A. K. Hunt
May 31—	Breamore	Miss V. Morgan
June 8—	Sandy Balls Wood (Near Fordingbridge)	Mrs. I. Sewell
June 16—	Clearbury Rings (Near Salisbury)	Miss M. Sparks
June 20—	Old Railway, Burley-Ringwood	Mrs. Killick and Mrs. Murch
June 27—	Trigon Estate, Near Wareham. (Courtesy of Mr. D. Sturdy, O.B.E.)	Miss G. West

June	29—Minstead and Little Picket	Mrs. A. K. Hunt
July	11—Hurst Castle	Mrs. Murch and Mrs. K. D. Killick
July	21—Keysworth (Courtesy of Mr. H. Clark)	Miss G. West
July	28—Marlborough Deep	Mrs. K. D. Killick and Mrs. Murch
Aug.	11—Kingston Common	Mrs. V. Morgan
Aug.	21—Coward's Marsh and Avon Meadows	Mrs. A. K. Hunt
Aug.	31—Canford School Grounds (Courtesy of the Headmaster)	Mrs. M. P. Yule
Sept.	18—Ninebarrows Down	Miss G. West

Geography **Chairman : Miss F. M. Exton,** B.A.

	LECTURE	LECTURER
Oct.	15—Based on Singapore	E. Chambers
Jan.	16 Austria	W. F. Perry, B.SC.
Feb.	11—The Land of the Midnight Sun	E. R. Bidder
Mar.	4—The Middle East	Miss F. M. Exton
Apl.	15—Geographical Field Meetings 1967	Miss F. M. Exton
June	7P–A cruise round the World	F. J. Wood

	PLACE	LEADER
Apl.	20—The Bourne Valley (with Botany Section)	Mrs. A. K. Hunt, Miss F. M. Exton and Mrs. V. Goulton
June	1—An Afternoon in Dorset	Miss F. M. Exton
July	26—River Avon, from mouth to source	Miss F. M. Exton and W. Thomas
Aug.	3—The Isle of Purbeck	Miss F. M. Exton and W. J. Middleton

Geology **Chairman : D. A. Wray,** Ph.D., M.SC., F.G.S.

	LECTURE	LECTURER
Nov.	5P–Contributions to the Geology of Bournemouth	R. Agar, A.M.I.C.E.
Nov.	10—Cornwall and the Isles of Scilly	W. A. Stinton
Dec.	10—The Scenery of Eire (Geomorphology)	Miss F. M. Exton
Jan.	28—Dorset's unique and varied Coastline	D. A. Wray

	PLACE	LEADER
July	6—Todber, Shaftesbury, Tisbury and the Nadder Valley	D. A. Wray
Sept.	8—Branksome Chine and Canford Cliffs	,,
Mar.	20—Visit to Russell-Cotes and Rothesay Museums	Mrs. N. Sephton

Photography **Chairman : Miss U. M. Ogle**

	LECTURE	LECTURER
Oct.	17—Four Principal Cities : Dakar, Rabat, Istambul and Lisbon	A. J. Butcher, F.R.I.B.A.
Nov.	12—Colour and Pattern in Nature	W. G. Lee
Nov.	14—Egyptian Journey	T. Clesly
Dec.	12 Kaleidoscope	Various Members
Jan.	9—Teneriffe — Mountains and Flowers	T. M. Bell, M.B., B.Ch.
Feb.	4—Look and Listen	D. Smith
Mar.	13—African Journey	F. R. Peck, A.R.P.S.
Mar.	29—Wild Life in Close-up (Jointly with Zoology)	R. Grimley

Physics and Chemistry **Chairman : Mrs. I. M. Bircumshaw,** B.SC.

	LECTURE	LECTURER
Oct.	1—Nuclear Processes in Stars	Sir Arthur Dixon, C.B., C.B.E., B.A.

Nov. 21—Semi-Precious Stones	Mrs. I. M. Bircumshaw
Dec. 21—Power from Fusion, I	H. E. Clark, M.A., B.SC., F.R.I.C.
Jan. 14—Power from Fusion, II	,,
Feb. 20—The Development of Pharmacy in Great Britain	Prof. J. R. C. Bateson, B.Pharm., F.P.S., A.C.T.
Mar. 18p–A Belief in Order	A. C. Riddiford, B.SC., Ph.D.
Sept. 20p–The Physics of Vision (and some Optical Illusions)	Mrs. I. M. Bircumshaw

PLACE	LEADER
Feb. 15—Visit to the Laboratories of Poole Gasworks	Mrs. I. M. Bircumshaw
Aug. 18—Visit to Poole Power Station	,,

Zoology — General **Chairman : H. V. Harris**

LECTURE	LECTURER
Oct. 10—Fallow Deer	Miss K. M. Bennetts
Nov. 19—Grey Seals	Oliver Hook, F.Z.S.
Mar. 29—Wild Life in Close-up. (jointly with Photography)	R. Grimley

PLACE	LEADER
Oct. 18—The New Forest	Miss K. M. Bennetts
June 6— ,,	,,

Zoology — Entomology **Chairman : K. G. Goodyear,** F.R.E.S.

LECTURE	LECTURER
Oct. 29—Aspects of the Ecology and Conservation of a Heathland Habitat	K. G. Goodyear
Jan. 21—A selection of British and Foreign Insecta	,,
Apl. 1—British Odonata	,,

Zoology — Ornithology **Chairman : H. V. Harris**

LECTURE	LECTURER
Mar. 15—Some Birds of the Costa Brava	Michael Hollings, D.SC.

18 Field Meetings were held as follows :—

Stanpit Marsh on Oct. 24, Dec. 22, Jan. 19, Feb. 21, Mar. 21, Apl. 4, Aug. 30, Sept. 12—all led by H. V. Harris. Other Field Meetings led by H. V. Harris were : Nov. 22—Poole Harbour E, Dec. 1—Studland Bay, Jan. 6 and Mar. 7—Harbour Shore, Feb. 7—Littlesea Brands Bay, Apl. 18—Waterditch, May 22—Linford, June 13—The Stour and Kingston Lacy, July 4—Durlston, Sept. 5—Ballard Down. The Field Meeting at Verwood on May 5 was led by Miss E. F. Balfour-Browne.

MEMBERS' DAYS

Chairman: Mrs. N. Sephton

12 Members' Days were held, usually on the second Wednesday of each month, at which the following subjects were discussed :—Oct. 12—Is Space Research expenditure justifiable ? Nov. 9—The Origin and Progress of the Society and a Welcome to New Members. Dec. 14—Reports on the Cambridge and Nottingham Meetings of the British Association for the Advancement of Science. Jan. 11—Flashbacks on last Summer's Field Meetings. Feb. 8—Members' favourite transparencies. Mar. 8—Personal Impressions of the Middle East. Apl. 12—A Selection of Slides from the Society's Collection. May 10—British Bird Songs and the Sounds of Spring and Summer (recordings). June 14—The Society's Garden. July 12—Members' Gardens. Aug. 4—The Society's Library. Sept. 13—Discussion between tutors of the Southampton University Department of Extra-Mural Studies and Members of the Society on means of co-operation.

CINE FILM SUBSCRIPTION PROGRAMMES

Organizer and Chairman: J. C. Mitton

Three films were shown on each occasion:— Oct. 5—Tibesti, Ice Watchers, Asian Crescent. Nov. 2—Hampshire Birds, Sea Control, The Oil Rivers. Dec. 7—Arnhem Land, Coventry Cathedral, Christmas in Australia. Jan. 4—Wind on the Heath, Castle and Country, The Oraons of Bihar. Feb. 1—Florence, Balance of Nature, Highway of Infinity. Mar. 1—Roussillon, In the Beginning, Central Southern England. Apl. 5—Son et Lumière, Pakistan, Honey Bees and Pollination.

Obituaries

Miss Ida Evelyn Sheffield

Our Society, and particularly the senior members, sustained a great loss by the death of Miss Sheffield of whom we had seen little for the last ten years on account of her age and infirmity.

Miss Sheffield was an ardent naturalist who taught nature study and physical training in the preparatory school owned with her sisters. Some of her younger pupils are now members. With more time at her disposal she joined the B.N.S.S. in 1933 and was a regular attender at Lectures and particularly Field Meetings, where her detailed knowledge of local plants and insects was always a help. She was a keen observer. Her special interests were plant galls of which she often brought specimens, the homes and habits of spiders, and poisonous and edible fungi, about which she was always willing to advise. At Club Day she invariably brought some interesting weeds or wild species and rarer fungi. With the exception of twelve years on the Council she never held office but was typical of the keen naturalists who piloted our Society through a difficult time during and after the last War, and should be remembered for her zeal and success in recruiting new members to the Society and sustaining their interest in it. She was a model member.

Mrs. Helen Winifred Boyd Watt, F.Z.S., M.B.O.U.

Mrs. Boyd Watt died peacefully on 8th January, 1968, in her 90th year. She had led a remarkably active life and was well known to many of the most distinguished of British botanists and ornithologists. As a young woman she had developed a deep interest in natural history, and especially in ornithology. In 1907 she joined the Selbourne Society, becoming its Excursions Secretary in 1911. Seven years later she was one of the founders of the Gilbert White Fellowship.

Mr. and Mrs. Hugh Boyd Watt moved to Bournemouth in 1911. Mrs. Boyd Watt joined the B.N.S.S. in 1941 and almost immediately she was elected Chairman of the Zoology Section, a post she held with distinction until 1952. She remained a member of Council until the end. As soon as she joined she began to study botany seriously and was prominent among those who kept the Botany Section active during the difficult war-time years and the long illness of the Chairman, Mr. Beeching Hall, planning and leading Botany field meetings as well as those of her own Section. Such was her growing interest in Botany that she won a national competition by naming and locating 240 wild plants actually in flower on a given day in March, all in the neighbourhood of Bournemouth.

Mrs. Boyd Watt was chosen in 1949-50 to be the first lady President in the history of the Society. It was a year of great achievements, among them the organization of the first lecture ever to fill the Winter Gardens to overflowing, when she took the Chair at a lecture by Peter Scott on the Severn Wildfowl Trust. In 1951 she arranged another lecture at the Winter Gardens, this time by Field Marshall Viscount Alanbrooke. It was through Mrs. Boyd Watt that the Gilbert White Fellowship decided in 1951 to transfer its assets and membership to the B.N.S.S. It was fitting that the Society's contribution to the Festival of Britain was the Gilbert White Exhibition, of which she was the Director.

After resigning from the Chairmanship of the Section, Mrs. Boyd Watt continued to take a very active part in all the concerns of the Society. She also acted as the Society's representative at meetings of several national and regional bodies. Every year she would organise a group of members to attend the Meeting of the British Association for the Advancement of Science, a cause she never failed to foster with all her enthusiastic energy. She had been a Vice-President of the Society since 1951 and an Honorary Member since 1964.

William Percy Winter, B.Sc.

Mr. Winter was one of those rare people who in their old age can stand before an audience and speak impromptu and lucidly on the most abstruse problems of mathematics and astro-physics. Perhaps more extraordinary in these days of narrow specialization was his deep knowledge of history or his ability to light up a discussion with a Latin quotation, and among his papers is an essay on mysticism.

After graduating at King's College, London, Mr. Winter began a life-long career as a dedicated teacher, nearly all of it in Technical Colleges: the first two in Birmingham where he took every opportunity to attend lectures by Sir Oliver Lodge, then for 32 years from 1908 to 1940 at The School of Engineering and Navigation in Poplar, in the heart of Dockland (now the Poplar Technical College). One of his pupils was P. O. Evans who died with Scott in the Antarctic. The motto of the College is still the one devised long ago by Mr. Winter: ARTIFICUM NAUTARUMQUE NUTRIX.

In the First World War he served in a Searchlight Unit in London and on the French coast—his two brothers were killed in action. In the Second World War, after a year with evacuees in the country he returned to London to teach in Bethnal Green during the worst of the bombing and finally spent seven years at the Wandsworth Technical College. Lecturers who worked with him spoke of him as a most unusual colleague, so gentle and courteous and deeply learned, taking endless pains with every grade of student.

Mr. and Mrs. Winter moved to Bournemouth in 1949 and soon joined the B.N.S.S., which became a major interest in their lives. Mr. Winter was Chairman of the Astronomy Section from 1951 to 1966. He was elected President of the Society for the year 1964-65, Vice-President in 1966, and an Honorary Member in 1967. On the many occasions when as President it was his duty to propose a vote of thanks to the lecturer, his brief remarks were always fresh and original, often adorned by some perfectly chosen quotation. He died on January 17th, some two weeks after his last attendance at the Society. On January 21st, Mrs. Winter, in the words of his sister, "just died" on rising in the morning. They were "Lovely and pleasant in their lives, and in death they were not divided."

Herbert Edmund Clarke, M.A., B.Sc., F.R.I.C.

On February 14th, 1968, the Society sustained a grievous loss by the death as a result of accident of Mr. Clarke, a valued member and scientist of outstanding knowledge and ability. He joined the Society in 1945 after a brilliant career as research worker and consultant in industrial chemistry.

The high quality of his undergraduate studies as a Scholar of Jesus College, Oxford, led to two years of post-graduate research and the award of the Research Degree B.Sc. (Oxon). From 1919 to 1920, as chief chemist to a large firm, he originated improvements and important developments for processing lead and its use in pigments, spending two years introducing the results of this work in the U.S.A. Back in England during World War I he contributed many improvements in the same field, and in 1918 was admitted as an Associate of the Royal Institute of Chemistry.

Between the wars Mr. Clarke specialised more and more on lead-acid accumulators: from 1930 to 1939 as Chief Research Chemist with the firm of Joseph Lucas. In 1935-36 he travelled as consultant and advisor in Western Europe, America. South Africa, Australia and a dozen other countries in the Near and Far East. At the end of this period some of his technical articles were published in book form. In 1939 he was made a Fellow of the R.I.C. for his contributions as author and consultant. Several patents for lead techniques bear his name.

From 1939 to 1945 he was engrossed in the war effort, being seconded as Chief Chemist to a Research Organisation. On confidential development of combustion systems in jet aircraft he undertook many experimental flights.

Mr. Clarke's potential for the Society was immediately recognised. In 1948 he was appointed Chairman of the Physics and Chemistry Section, which he enriched with his own erudition and up-to-date knowledge, and also by the introduction of many lecturers of national repute. He himself delivered some sixty lectures to the Society. In 1949 he was appointed Deputy Chairman and was Chairman of the Society for nearly five years from 1950. For several years he also helped with entertainments on social occasions. His total service on Council covered twenty years. He was elected President of the Society for the year 1952-53. His Address, entitled "Along the Frontiers of Physical Science" reveals his mastery of his own subject. In all our other scientific Sections he was always able to make valuable contributions in discussion. His short paper on "Desalination" in this volume shows that in his 82nd year he was not only well-informed and right up-to-date in his studies, but able to present difficult material with freshness and vigour. In 1967 the Society recognised his great services over a long period by making him an Honorary Member.

With all his brilliance as scholar and leader, Herbert Clarke was a man of great modesty and quiet versatility. During their twenty-two years as members Mr. and Mrs. Clarke made very many devoted friends. To Mrs. Clarke they now extend their deep sympathy.

Reports of Sections for the year ending September 30th, 1967

Library

At the Members' Day Meeting on August 9th Mr. G. A. Shillidy gave members a most interesting and informative talk on the "old" and also on the valuable books in the Reference Library, a summary of which is given below. The Hon. Librarian described the range of books in the Main Library (most of which can be borrowed by members) and drew attention to the new books which had been added in recent years. Many of these have been presented by members, and the Library Committee would again record its thanks to them.

H. S. Holbrook

On Members' Day, 9th August, 1967, a selection of old and noteworthy books from the Reference Library was shown. These books are of interest not merely because of their age or of their intrinsic value; they provide in some cases evidence of views held by scholars a century or more ago but which are now perhaps modified.

Religious and Scientific books were once written in Latin and later translated into English. We have one such instance of this in Brander's *Hampshire Fossils*, with the original Latin Edition 1766 and the English translation 1829. *Reliquiae Diluvianae* 1823 by Buckland is a well-known work by an eminent geologist of his day. For the botanist there is Evelyn's ~~*Seva*~~ 1776, the translation edition by SILVA Hunter. *British Wild Flowers* by Loudon, with numerous coloured plates, was once in a tattered condition but has been skilfully rebound into a handsome volume by Mrs. M. P. Yule. *Lessons on British Mosses* 1849 by Gardiner was published with actual specimens of mosses attached to the pages.

Ornithologists will be interested in Bewick's *History of British Birds* 1832, followed much later by *Water Colour Drawings of British Birds* by Thomas Bewick, compiled in 1930 by David Thomson. Our copy of Harting's *British Birds* 1872 is unique: it is the author's own copy with numerous personal notes throughout. *Conchology* 1823 by Mawes has fine examples of old art reproductions. Similar artistic work is found in *English Coleoptera* by Houghton. Camden's *Britannia* 1695 is a survey of the whole British Isles, each county having a map which shows the skill of the cartographer of the day.

Admirers of Gilbert White will find some thirty different editions of *Natural History of Selborne*. To help any research work we have the Proceedings of several local Societies and also a complete set of *Nature* from Volume 1 1869.

In addition to the books already mentioned the following were also shown:— *Remains Concerning Britain* 1674 Camden, the oldest book in our Library. *Ancient Dorset* 1872 Warne: an original subscription copy. *History of the Isle of Wight* 1872 Worsley. *Anecdotes and History of Cranborne Chase* 1818 Chaffin.

History of Cranborne Chase 1816 West. *New Forest* 1808 (2 volumes) Gilpin. Most of these volumes were presented by former members of our Society. They remain as reminders of the generosity and devotion of a previous generation.

G.A.S.

Museum

The collections in the museum seem of increasing interest to members. Displays on the hall table have allowed exhibits to be seen which cannot be shown elsewhere owing to limited space. From time to time these displays have included items from members' own collections: the Hon. Curator welcomes this co-operation.

The general upkeep of the museum owes much to the regular assistance of Mr. H. C. Blackmore and Mrs. V. W. Eaton.

MEMBERS' DAYS

These have been well attended. Over 50 members have spoken at the meetings, on diverse subjects and with a variety of slides, ranging through most of our Sections.

ACQUISITIONS DURING THE YEAR

1. Carved wooden animal figures, Kenya native work (the late Mrs. M. D. Selfe).
2. A pair of Caribou Antlers (Miss K. E. Birchenough). These were found by an Eskimo five miles within the Arctic Circle and given to Miss Birchenough's father, the Rev. Allan Oakley Birchenough, D.D., who worked with the Grenfell Expedition 1906-07. The antlers together with other objects from Newfoundland loaned by Miss I. I. Biss, a member of that expedition, were displayed in connection with a lecture given by Mr. J. C. Mitton, to which both ladies were invited.
3. A small collection of shells (from the estate of Miss I. E. Sheffield). These are in process of identification, etc., and will be arranged in the wall cabinet of the museum containing "Common Objects of the Seashore", which is of particular interest to our younger visitors.
4. Fossil tooth and tusk of Pigmy Hippopotamus and Fragment of Deer Antler from Ghar Dalan, Malta (Brig. A. B. D. Edwards) have been identified at the S. Kensington Museum as *Hippo Minutus*—tooth and upper tusk fragment, and *Cervus*—part of antler with underlying bone breccia. Excavations in the Ghar Dalan Cave, Malta, took place in 1922 (D. M. A. Bate). Other fauna found were *Equus, Bos, Sus* and the remains of a bird. Potsherds included 108 Bronze Age fragments.

The thanks of the Society are offered to the donors.

Once again the Hon. Curator wishes to record her gratitude to the Chairmen of the Sections for their ever-ready help and support.

N. Sephton

Lantern Slide Collection

The Society has a collection of over 10,000 slides which are available to members for lectures, etc. and which can be examined and borrowed by members on contacting the custodian. The collection has been accumulated from the early years of the Society and additions are still being received. As most of the slides were the property of past members and represent many years of work in the Society before the days of modern colour transparency, they are the pre-1939 standard size of 3¼ inches square. Most of these are monochrome slides of good quality, but there are also coloured slides, a number of which are hand coloured, including many of surpassing quality and beauty.

Up to about 1953 the slides had been catalogued and numbered individually. The many slides received since are being sorted under subjects, so that even if not catalogued, slides on a given subject can be traced. Members whose work and interests are recorded in the collection include, amongst others, Professor John Cameron, Major A. R. Dugmore, Messrs. A. J. Aiers, L. Beeching Hall, Claud Lyon, F. W. Robins, V. du B. Smythe, S. Whitaker, W. J. Woodhouse and S. R. Wycherley. The slides cover all the Society's main interests and extend to such subjects as Crystallography, Metallurgy, Conchology, etc. Unfortunately many sets are unaccompanied by notes and have untitled slides, so that their value is considerably reduced.

The Society holds a large collection of the work of the late Dr. F. G. Penrose, presented by the Misses Penrose. These large colour transparencies, made some sixty years ago when colour photography was still experimental, are of considerable historic interest. In addition the Society has the nucleus of a collection of the modern 2 inch square slide, mostly in colour, and steps are being taken to catalogue these. There are also a number of photographs—mainly views—for use in the episcope.

J. C. MITTON

Garden

It is pleasing to report that several visiting lecturers have in the past year made favourable comments on the B.N.S.S. garden. Older members will remember the moribund pine trees and thicket of brambles which so long occupied the lower half and will have noticed the progress of the new plantings which have now achieved the intended effect when the garden was re-designed seven years ago. The south screen of cypresses and copper plums now ensures beauty and privacy all year round and the lawn has ample space for all purposes.

From the first winter Iris in January there is always something of interest which recently-joined members could explore. Last May was inclement for our many rhododendrons but the Purple Splendour and the sweet-scented *R. loderi* deserve mention. The Chili Flame Tree (*Embothryium*) flowered for the first time in the hot June, and the long summer gave splendid flower shoots and even seed pods to the New Zealand Flax (*Phormium tenax*). The curious Dawn Cypress (*Metasequoia*), a connecting link amongst conifers, now shows typical foliage alongside the handsome copper Cryptomeria. Nearby are two species of Ruscus, the Butcher's Broom (*R. aculeatus*) and the true classic Victor's Laurel (*R. androgynus*). The Bladder Senna (*Colutea arborescens*) had magnificent clusters of bronze flowers and later its Zeppelin-like fruits. Near the handsome Grisellinia, a sea-side tree of New Zealand, the mass of a Veronica elliptica variety, planted on a large dead stump of Sycamore, shows the habit of decaying-driftwood flora. The Aristolochia had abundant "Dutchman's Pipe" flowers under its large leaves. A pretty little recent addition is the Blue-Eyed Grass (*Sisyrinchium*), a member of the Iris family. At the exit gate our splendid specimen of Ginkgo biloba still flourishes, but this coal-age connecting link between higher Ferns and Flowering Plants has never flowered for us.

The preceding are but a few examples of the interesting rewards of a ramble round the garden. A list of about 30 species is available to help new members.

It is obvious that such a garden as ours needs much attention. The Chairman is very grateful to the select few members who have so kindly assisted in its maintenance and to those who have presented plants during the last year, but much more help is needed. Members who would like to derive pleasure in doing this important work for the Society will be welcomed by the Chairman.

WINSOME CHOME

Archaeology and History

Seven lectures and two field meetings were organised, particulars of which are given on page 20. The last lecture, entitled "Prehistoric Man in Wiltshire", was an introduction to an Archaeological Tour of Wiltshire in June. This tour commenced with a visit to Salisbury Museum, where the Curator, Mr. H. Short, M.A., F.S.A., gave a talk on Old Sarum and Stonehenge, using the excellent models and artifacts in the Museum. The date being that of the Summer Solstice, we found that Stonehenge had been taken over by the Druids in their ceremonial robes. They were enacting their ancient rites, complete with incense, drinking horn and the "Sword of Peace", although the Druids had played no part whatever in the erection of the stone circle, which predated them by a thousand years. Visits to Woodhenge, West Kennet Long Barrow, Avebury and Silbury Hill completed the tour, which may be repeated when the B.B.C. project on Silbury Hill is sufficiently advanced.

The Chairman would like to take the opportunity of thanking all who have helped the Section by their interest and support, and also, on behalf of the

Society, to express our thanks to Sir John Summerson of the Soane Museum for his valued assistance in the identification of the Belzoni Plates.

THE BELZONI PLATES

Among the Egyptian Antiquities in the Society's Museum is an unbound but complete copy of the Folio Volume entitled "Operations of Belzoni in Egypt and Nubia" which was published as a supplement to Belzoni's major work, "Narrative of the Operations and Recent Discoveries within the Pyramids, Temples and Excavations in Egypt and Nubia, etc.".

The publisher was John Murray of London. The first issue of 1,000 copies in 1820 had a ready sale at 2 guineas for the "Narrative" and 6 guineas for the Folio Volume of 44 Plates. Of the 44 plates, 11 are coloured lithographs of drawings by Belzoni and 7 by his collaborator, Dr. Alessandro Ricci; 17 are etchings by Aglio from drawings by Belzoni; 2 prints are by C. Scharf and 4 have no signature. They vary in size from 23″×17″ to 17″×10″, and, with the exception of 2 maps, are in vivid colourings. Each plate in the Society's set bears the legend "London, Published by J. Murray, 1820", and the lithographs have the name of the lithographer, C. Hullmandel.

Giovanni Battisti Belzoni was born of poor parents in Padua in 1778. As a young man of a restless and adventurous nature he left his native land, which was impoverished by the Napoleonic Wars, and travelled through Europe in search of employment. Eventually he arrived in England where he settled and was married. He was a giant of a man of splendid physique and soon found work doing "strong man" and similar acts in the fairs and theatres of the British Isles. Later he arranged scenic effects in the theatre with fountains and cascades of water, using hydraulic equipment which he had himself developed with great skill.

In 1815 he went to Egypt, hoping to interest Muhammad Ali in a new type of water wheel which Belzoni had invented for irrigation purposes. The project failed and eventually in 1816, perhaps because of his prodigious strength, he was commissioned by the British Consul in Egypt to bring the colossal head of Rameses II from Thebes down to the banks of the Nile for shipment to England. He succeeded in this Herculean task, and the head, known as "Young Memnon", is now in the British Museum.

This was Belzoni's first introduction to the Antiquities of Egypt and it aroused his keen interest. He soon began his own ventures, among which were such great achievements as the excavation of the temple of Abu Simbel, the discovery of six Royal Tombs, including the famous one of Seti I, the opening of the Second Pyramid at Giza and the finding and identification of the site of the lost Red Sea port of Berenice, all of which have added so much to our knowledge of Ancient Egypt.

The plates, which represent scenes from his travels and excavations, exhibit no mean degree of draughtsmanship and design, in which Belzoni was ably assisted by the artistic young doctor Alessandro Ricci.

Plates 42 and 24 showing the Abu Simbel Temple almost completely covered with sand, and Karnak with its temples, pillars and statues devastated by the earthquake of 27 B.C., as Belzoni saw them 150 years ago, are of immense interest, contrasting as they do with the appearance of these monuments today.

There are two very good maps: one of the "Roads to the Mountains of Emerald" during the search for Berenice (Plate 38), and the other of the "Valley of Biban el Mulah", now known as the Valley of the Kings, where the tombs of the Kings were discovered (Plate 39).

The more colourful and the most beautiful plates in the collection are copies of the original drawings by Belzoni and Ricci from the Tomb Paintings of Seti I. They were drawn and painted, using no other illumination than the light of candles, from the life-size paintings of Seti and the Gods on the pillars and walls of the tomb. Although these original drawings cannot be traced and are therefore not available for comparison, they must have been artistic gems: the rich blues, deep ochrous reds and brilliant yellows and green of the reproductions reflect the colours and retain the splendour of the actual Tomb Paintings themselves. Plates 6, 7 and 8 represent men of four races who appear to be following in the Pharaoh's funeral procession. According to the frontispiece in the Folio Volume of the Plates in the British Museum, those painted in ochrous red represent Egyptians who were released from captivity by the

Hero (Seti I), while the black and white men, some of whom are bearded and tattooed, represent Ethiopians, Jews and Babylonians captured in battle by Seti.

A particularly fine Plate is that of the Pharaoh seated on his throne before an altar, holding in his hand the Vannus emblem of majesty and dominion (Plate I); another shows a Goddess stretching protective wings over him (Plate 3).

Outstanding in brilliance in both colour and conception are those of Seti I on his arrival in the Underworld (Plates 4, 5, 18 and 19). Sponsored by the falcon-headed god Horus—the personal god of all the Pharoahs, he is greeted by Ptah—Creator of the World and God of Art and Artifice, welcomed by Hathor—Goddess of Love, Joy and Music with the gift of a gold torque from her own neck, and finally received by Osiris himself—Lord of the Underworld, and his wife Isis: welcomed as brother and co-equal in glory, living for ever.

The wonderful dress of Hathor, which is made of sheer gossamer embroidered from neck to hem with rows of hieroglyphs and the magnificent regalia of the Pharoah, are worthy of note as indicative of the high fashion of the period.

C. Simpson

Astronomy

During the session four lectures were given, details of which can be seen on page 20. The Chairman would like to give special thanks to the two visiting lecturers, Mr. G. McClorry and Mr. A. C. Curtis, F.R.A.S. Mr. McClorry illustrated his talk on Astronomical Navigation with the aid of an overhead projector. The lecturer drew diagrams, etc. on a plate on his reading desk while facing the audience, and these were clearly reproduced on the screen behind him.

The visit to the Royal Greenwich Observatory at Herstmonceux was attended by the maximum permitted number of members (20) on the basis of first come first served. The Chairman and members wish to record their thanks to the Astronomer Royal for his kind permission to arrange this first visit by the Section to Herstmonceux. It is hoped that the Session 1967-68 will provide clear night skies on the right occasions for using the Chairman's 7″ reflector.

The Astronomy Section has recently suffered a grievous loss in the death of Mr. W. P. Winter, who had been its distinguished Chairman for fifteen years.

THE PLANET MERCURY: A WORLD OF EXTREMES

(*Abstract of a lecture by the Chairman on 22nd October,* 1966)

Because it is the nearest planet to the Sun, and also has the fastest orbital velocity, Mercury, especially in this country, is never seen at any great altitude and remains for only a few days at its best position. It is therefore a difficult planet for observation, being never more than 28° away from the Sun at its greatest elongation. From our latitudes Mercury can only be observed for some 30 days in any one year, and for approximately 30 minutes on each of these days: this gives only about 15 hours in which to study the planet each year.

Mercury is a planet of many extremes. It has the smallest diameter of all the planets—31,000 miles, about $\frac{3}{8}$ that of the earth or $\frac{1}{3}$ that of the Moon. Of all the planets, it has the smallest surface area, mass, volume and surface gravity; it has however the greatest density, its only close rival in this respect being the Earth. If the values for the Earth are represented by the figure 1, those of Mercury are as follows: Mass—0.55, Volume 0.53, Density 1.04. (If the density of water is given as 1, that of Mercury is 5.72).

The albedo of Mercury is the lowest in the Solar System, taking the planets only into account: the actual amount of light from the Sun which it reflects back out into space is 7% compared with 37% for the Earth (the Moon's albedo is also 7%).

Mercury receives the greatest amount of light and heat from the Sun, and yet at the same time it is the hottest and coldest planet in our System. The reason for this is that, as far as we know, it has no atmosphere, and (as we shall see later), it keeps one face always turned towards the Sun: thus the sunwards side has a temperature of 348°C., whilst the side turned out and away from the Sun has a temperature of minus 245°C.

Because it has a captured rotation, with one face always turned towards the Sun, Mercury has the longest rotation about its axis in the Solar System—

about 88 days; and of course its Sidereal Period (or year) is also 88 days, i.e. a day on Mercury lasts the same time as a year.

Except perhaps for Pluto, Mercury is the only planet without any appreciable atmosphere. If there is any atmosphere at all it must be extremely rare, and may even be only localised; in any case it would only contain the very slow-moving gasses.

Of all the planets, this little world sweeps out the least amount of area in its travels round the Sun; its orbital velocity, 29.8 miles per second, is the highest, and its sidereal period of 88 days is also the shortest; its orbit, except for that of Pluto, has the greatest eccentricity, i.e. the Sun is displaced well away from the centre of the orbit. The mean distance of Mercury from the Sun is 36 million miles, but this can vary from 29 million miles (Perihelion), to 43 million miles (Aphelion). Again, except for Pluto (which may or may not be a true major planet), the inclination of Mercury's orbit is the highest, being 7° from the plane of the Earth's path round the Sun. Finally, Mercury and Venus are the only planets which do not possess any attendant moons.

C. M. Pither

Botany

A glance through the list of lectures and field meetings printed earlier in the Proceedings will prove that this Section has continued to maintain its customary high standards. The field meetings have included visits to several new places, with consequent additions to our knowledge of the distribution of the local flora.

Records of all field meetings have been most efficiently kept by the Secretary of the Botany Section, Mr. M. H. Cocke, who reports that the current book, covering the years 1963-67, will be completed, with full index of plants recorded, by the end of this year. The book will then be placed for a time in the Main Library for the use of members and later transferred to the Botanical Section of the Reference Library which is to be found in the Botany Room.

Unfortunately Mr. Cocke now wishes to resign from this work which he has carried out meticulously over the past eight years. We should like to take this opportunity of registering the grateful thanks of the Section. We are glad to be able to announce that Miss K. Rushton, M.SC., M.B., CH.B., has agreed to undertake this work.

We congratulate Mrs. M. P. Yule on her appointment by the Council of the Botanical Society of the British Isles as Plant Recorder for the Vice-county of Hampshire and Isle of Wight. Mrs. Yule has gained a detailed knowledge of the flora of the area as she is busily engaged preparing the material for a new Flora of Hampshire and Isle of Wight. This work was started by Mr. A. W. Westrup who, unfortunately, died suddenly in 1964, leaving his notes to the Hants & Isle of Wight Naturalists' Trust. Mrs. Yule, who had worked with him, was ultimately persuaded to continue with it. Naturally the first year was exceedingly difficult, but Mrs. Yule has bravely overcome all obstacles and now reports that a tremendous amount has been accomplished with the aid of many distinguished botanists and the B.S.B.I. This recording should be complete fairly soon and arrangements for writing and publication are in hand. This section is rightly proud to describe such an achievement by one of its members.

PLANT NOTES FROM THE RECORDS

Gentianella anglica and *Ophrys sphegodes*—Dancing Ledge May 1967. *Chaenorhinum minus* and *Senecio viscosus*—old railway line near Bagnum, Burley. *Pernettya mucronata*—near Burley. *Galium debile*—near Marlborough Deep, New Forest. *Catapodium marinum*—Hurst Castle. *Petroselinum crispum* continues to increase at Hurst Castle. *Catabrosa aquatica*—Trigon and Keysworth. *Setaria virides*—Coward's Marsh. *Cynoglossum officinale* and *Hyoscyamus niger*—Ninebarrow Down.

MYCOLOGY

Mr. V. H. Pickering, member of the British Mycological Society, continues his work on the Fungus Flora of the New Forest and reports several discoveries:— 1. *Pleurotus lignatiles*—very rare (verified by Dr. Manners of Southampton University. 2. *Panellus nidulans*—possibly a new record for the Forest. 3. *Clavaria* *longicaulis*—so far only known in Britain from beneath one tree in the New Forest. 4. *Poronia punctata*—this species occurs on pony dung, and when reported in the bulletin of the British Mycological Society it aroused considerable interest as it is almost extinct. The Royal Botanic Gardens at Edinburgh are anxious to obtain specimens of this fungus, so should any member observe greyish-white disc-like fungi on pony dung they are asked to collect it and send it to Mr. Pickering with a note of the location.

During the recent fungus foray about 100 species were identified, including a good specimen of *Boletus parasiticus* which only grows on *Scleroderma aurantiaca,* and *Cordyceps militaris* which grows from the body of a pupating caterpillar.

A. K. Hunt

Geography

During the year this Section arranged eight lectures and five field meetings, details of which are in the Council's report on page 21.

In March the Chairman's lecture on the geographical background of the Middle East followed by a Members' Day when personal impressions of the area were given, appears to have been opportune considering the focusing of world attention on this region by the Arab-Israeli War in June.

In May a three-day field meeting in the Isle of Wight provided an opportunity to study the geomorphology of this interesting island which in so small a space has so many different geological formations resulting in a great variety of scenery.

The Chairman has much appreciated the help given by Mr. W. C. Thomas, who has proved to be such an energetic and able Secretary for the Section, and would like to thank the lecturers.

THE WILTSHIRE AVON

On July 16th the sixty-six members of a field meeting followed the Wiltshire Avon from its mouth at Christchurch to its source in the Marlborough Downs. The river flows through three very different geographical regions: (1) from its source to Upavon, (2) Upavon to Salisbury and (3) Salisbury to the sea.

FROM CHRISTCHURCH TO SALISBURY the Avon is meandering over a wide flood plain on the Tertiary sands and clays of the Hampshire Basin. The rich water meadows are devoted to cattle rearing, with crop growing above flood level. The possibility of flooding also determines the position of the settlements which are mostly well away from the river at the foot of the valley slopes, especially on the eastern side at Ripley, Gorley, Hyde and Hale. Where there are river crossings and side valley routes, the market towns of Ringwood and Fordingbridge are situated.

At intervals at the sides of this part of the valley, notably at Woodgreen, there are remains of terraces covered with valley gravels. These show that the Lower Avon was once flowing at a considerably higher level and was then a much smaller stream than it is to-day, probably rising near Downton.

At that time the Nadder, Wylye, Upper Avon and Bourne which join near Salisbury, as well as the Ebble, may have flowed eastwards from near Alderbury to the river Test along a wide valley now occupied by the insignificant Lockerley Brook. Then, probably owing to an uplift of the land, and perhaps augmented at the end of the glacial period when great quantities of melt water were coming from the thawing ice sheets, these rivers cut through the waterparting to the south and joined the Lower Avon to form a much larger river capable of down-cutting, thus leaving the gravel terraces high above the present plain.

BETWEEN SALISBURY AND UPAVON the Avon is flowing through the chalk rim of the Hampshire Basin. The river is meandering, but owing to the increase of power due to the steeper gradient and the greater volume of water mentioned above, the meanders are incised into the chalk upland, and spurs of higher land come down to the river leaving only small areas of lowland. This is a very picturesque part of the course with beautiful villages strung along the edge of the hills, overlooking the river—on the west the Woodfords and Lake, and on the east Durnford, Figheldean, Fittleton and Chisenbury. Apart from army camps the only considerable settlement is Amesbury with its Abbey ruins, situated at an important crossroads.

UPAVON TO THE SOURCE: At Upavon the Vale of Pewsey is reached. This is a classic example of the denuded anticline. The Upper chalk of Salisbury Plain was once continuous in an upfold as far as the Marlborough Downs, but the weak anticlinal structure was broken down, so that the underlying lower chalk and upper greensand have been exposed. The geological formations can be seen very clearly in the utilization of the land, for on the greensand are the meadows of the dairy farms; the lower chalk is cultivated with grain and fodder crops; while there are open pastures on the upper chalk. The villages are on the spring lines at the hillfoot and the parishes are long and narrow, extending up the slope so that each has its share of the different types of farming country.

On the Ordnance Survey Map the river Avon is shown as rising near Milton Lilbourne and flowing from the east, but considering the structure of the area it seems more likely that the original drainage ran from North to South. If this is so the real sources of the Avon are the two dry valleys on either side of the White Horse on Walker's Hill above Alton Priors, the east-west drainage having developed subsequently.

An interesting feature of this area is a section of the Kennett-Avon Canal, which follows the contours at the north of the Vale, so avoiding the necessity for locks. At Devizes however the Canal descends to a lower level by a staircase of locks. Although attempts are now being made to restore this waterway, it will never regain the importance it had in the late 19th century, evidence of which can still be seen in the quays, waiting-rooms and warehouses, and the Barge Inn at Honey Street.

F. M. EXTON

Geology

Three of the winter lectures were devoted in the main to geology and one to geomorphology. In November, one of our members, Mr. R. Agar (Deputy Engineer to the Bournemouth Corporation), gave an interesting account of the rocks encountered in excavations for new pipe lines in many parts of the borough for a new and extensive sewage system. They revealed some unusual and hitherto unsuspected features, and were admirably illustrated by the lecturer's excellent diagrams and sections. Later in the month we were given a well-illustrated account of the geology of Cornwall and the Isles of Scilly by Mr. A. W. Stinton, a former Hon. Secretary of the B.N.S.S., who also provided the excellent colour slides for the Chairman's lecture on the Dorset coast sections extending from Studland and Swanage to the Isle of Portland. In Miss F. M. Exton's most informative lecture on the scenery of Eire we were given a full treatment of the island's geomorphology.

In March, at the invitation of the new curator, Mr. G. Teasdill, a large attendance of members visited the Russel-Cotes and Rothesay museums. In the summer two field meetings were led by the Section Chairman. The first was a full day's excursion by coach and is described below. Later he led a large party down Branksome Chine and along to Canford Cliffs, when many of the distinctive physiographical features of the district were studied.

EXCURSION TO TODBER, SHAFTESBURY, TISBURY AND THE NADDER VALLEY, JULY 6th, 1967.

Along the Dorset coast from Swanage to Weymouth and beyond are a remarkable series of cliff sections of Upper Jurassic rocks. The various sub-divisions in succession from east to west are known respectively as Purbeck, Portland, Kimmeridge and Corallian. These names are now used by geologists for rock of this particular geological age; this is indeed the type area for these formations.

As we proceed inland however they are overlain by the thick mass of the Chalk formation, with the Greensand at its base, which extends from the Dorset coast northwards to Salisbury Plain and beyond. Thirty miles to the north however, in the Nadder valley, the Upper Jurassic rocks are again exposed at the surface, due to the broad anticlinal fold or uplift which is sometimes referred to as the Vale of Wardour anticline. It was this area that the party investigated.

Around Todber and Marnhull there are extensive quarries where the Corallian limestone has been quarried for local building purposes since Prehistoric and Roman times. These rocks, corresponding to the Osmington Oolite of the Dorset coast, are creamy even-grained oolitic limestones in which we found occasional fossil shells in many places. In the quarries, which are no longer worked for building stone, numerous prehistoric and Romano-British remains have been found in some profusion and include human remains, spindle-whorls, Bronze-age implements and Roman coins. During our visit a complete human skeleton, which had recently been excavated by pupils from the Gillingham School Historical Society, was seen in a remarkable state of preservation. Experts who have since visited the site describe the skeleton as that of a middle-aged man buried in the late Roman style.

At the brickworks at Gillingham the Kimmeridge Clay is admirably exposed, and from it many extinct ammonite and saurian remains, including vertebrae, have been obtained; many of these are now exhibited in the Gillingham Museum. The party were able to make a good collection of selenite crystals which are relatively abundant in the clay.

From Gillingham the party proceeded to Shaftesbury, which stands on an outlier of Greensand. Here there are remarkably extensive views both to the north and the south. The rolling Chalk Downs extend for many miles to the south. To the north is the Vale of Blackmore, floored in the main by Kimmeridge Clays, and beyond is the wide extent of the Chalk of Salisbury Plain.

On the way from Shaftesbury the party passed through East Knoyle (the birthplace of Sir Christopher Wren), and on to the extensive chalk plateau of South Wiltshire. Notable features pointed out were the many steep-sided 'dry' valleys and the numerous prehistoric mounds so characteristic a feature of the chalk downs. To the immediate north of Mere are some very striking examples of 'Lynchets' which furrow the chalk slopes and are generally looked upon as prehistoric cultivation terraces. We were unfortunately unable to examine the chalk at the extensive Charnage Quarries as the modern methods of excavation and extraction produce clouds of fine chalk dust which obscure the working face and extend over a wide area.

At Hindon we left the almost barren chalk downs, and following a tributary valley of the River Nadder we passed through the delightful scenery and rich foliage of the Fonthill Estate. Here the rock forming the floor of the valley is the Chilmark Limestone, while the remarkably attractive slopes consist of hillocks of Greensand covered with firs and other coniferous foliage.

Entering Tisbury we followed the Newtown road to the last quarry now working the famous Chilmark Stone. Mr. Green, who works the stone solely for sculptural repairs, produced some interesting ammonite shell remains which clearly indicate that the Chilmark Stone is the local representative of the Portland Stone of South Dorset.

Chilmark freestone was at one time one of the most important building stones in Britain. It was largely worked underground in immense galleries extending south of Chilmark and under the Common towards Chicksgrove. During the First World War these galleries were appropriated by the War Office to be used as one of the largest underground stores of explosives in Britain. The roof of the quarries consists largely of Purbeck Limestones and Marls. Salisbury Cathedral, Wilton House and many of the adjacent halls and buildings are built almost entirely of Chilmark Stone.

From Tisbury the party travelled down the Nadder valley, making a brief diversion to visit the attractive villages of Teffont Evias and Teffont Magna. These are built alongside a small tributary stream and among some of the most delightful scenery in Wiltshire.

In a steep road-cutting about a mile and a half to the east of Teffont Magna and to the immediate north of Dinton there is an excellent section of rich shell-bed in the Greensand, where everyone was able to collect some characteristic fossil shells of *Ostrea vesiculosa.*

In conclusion the Chairman wishes to express his deep thanks to Mrs. N. Sephton who made the detailed arrangements which contributed so much to the success of this excursion.

D. A. Wray

Photography

The slide shows under this Section comprised a very varied programme, which is given in detail in the list on page 21. I should however like to specially thank our guest lecturers.

In the Autumn of 1966 we had Mr. W. G. Lee's "Colour and Pattern in Nature", with very beautiful examples illustrating his title, and Mr. Peter Clesly took us on "An Egyptian Journey", many slides of which are now of historic interest. Mr. Don Smith's "Look and Listen" was a tape recorded programme of excellent music divided into various sections of appropriate slides with dual projection. Mr. F. R. Peck, A.R.P.S., took us on an "African Journey", and Mr. Roy Grimley showed some splendid examples of "Wild Life in Close-up" This lecture was given in conjunction with the Zoology Section.

Many inexpensive cameras are now being manufactured which are easy to handle and within their limits will produce quite good results. If any members feel that they have slides of interest and quality, perhaps they will contact the Chairman, who will be glad to include them in a future "Kaleidoscope" programme.

U. M. OGLE

Physics and Chemistry

During the Session seven lectures were given and two visits made: the full list is given on page 21.

Sir Arthur Dixon, C.B., C.B.E., B.A., lectured on "Nuclear Processes in Stars". One of the problems arising in this connection is how to account for the proportions in which different elements appear to be present in the sun and in other stars in various stages of development. After some introductory remarks on the atomic structures of the elements themselves, he referred to a number of ways in which heavier elements might be formed from lighter; in particular helium from hydrogen by direct fusion or by way of the "Carbon cycle", and elements such as neon, magnesium, perhaps up to calcium, by the α-process ("alpha process")—successive captures of helium nuclei. Yet others might have been built up by successive captures of neutrons. So far there seemed to be no clue to the formation of some of the heaviest elements in the sun, unless as the product of stellar explosions elsewhere in space.

This lecture was followed up appropriately by two meetings devoted to the showing of two important new films issued by the U.K. Atomic Energy Authority under the title of "Power from Fusion". Mr. H. E. Clarke, who had only just retired from his many years of highly successful Chairmanship of this Section, introduced the films.

Both the guest lecturers spoke on aspects of the history of Science. Prof. F. R. C. Bateson's lecture on "The Development of Pharmacy in Great Britain" led to a keen discussion on many aspects of pharmacy. Dr. A. C. Riddiford (Reader in Physical Chemistry at the University of Southampton) delivered a powerful lecture entitled "A Belief in Order". He developed the thesis that a belief in order is an essential feature of mankind and especially of scientists. Lacking this belief, there would be no point in their continuing activities. One clear example of the way in which this belief has guided experimental workers is provided by the attempts made by scientists, and particularly by chemists during the 19th century, to classify the chemical elements from which the observable world is compounded, and to explain the classification which they finally adopted. The story was taken from classical times up to Mendeleeff, who in 1869 put forward his Periodic System of Classification of the Elements. Mendeleeff assimilated the views of earlier workers, and seeing clearly the pattern which led to his Classification, argued that the available experimental evidence at that time was wrong in those cases where it conflicted with the order which he saw to be necessary. This led to the discovery of new elements.

The explanation of the order and pattern found by Mendeleeff in 1869 came only when physicists began to explore the detailed structure of the atom. In this sense the torch has been handed on from chemists to physicists. Curiously enough we now find ourselves, one hundred years later, to be in almost exactly the same situation that Mendeleeff faced. He had to explain the order apparent in some 69 then known elements. To-day we need to find order and pattern in at least as many so-called fundamental particles.

Dr. Riddiford ended with an appeal to all science students to study the history of scientific discovery.

The writer would like to take this opportunity to express her thanks to the many officers and members of the Society who have helped and encouraged her during her first year of office.

I. M. BIRCUMSHAW

WATER AND ITS DESALINATION

Liquid water, because it is a fundamental constituent of every living cell and every organism on earth (plant or animal) is incomparably the most essential factor in organised nature upon this planet. Some 71% of the earth's surface is permanently under water, and the wanderings or settlements of homo sapiens, who needs up to two gallons per day to quench his thirst, have been determined largely by its availability. If water is lacking through drought he will die in a few days, whereas he could survive as many weeks without food. The gruesome fact remains that notwithstanding all probable developments 400 million people will be liable to die through failure of drinking water in 1980, for two-thirds of their normal body weight is water.

There is probably no chemically pure liquid water in the world despite the enormous volume available in impure form in seas, lakes, rivers and shallow pools or wells. Rain or melting snow quickly leaches out soluble salts from the land surfaces on which it falls, and whether or not the water in catchment areas can continue to be fit for drinking for a prolonged period will depend upon the size, altitude, exposure to solar radiation and freedom of flow (neglecting for the moment organic pollution). However, until dissolved salts reach a level of 500 parts per million, the water is accredited suitable for drinking. In the last two generations the conventional or anticipated daily demand per capita has risen from 40 to 200 gallons (by 2000 A.D.) and involves bacterial safeguards and elaborate processes of desalination, since water must now be drawn from sources, especially on the banks of rivers, which may be tapped and desalinated several times on their way to the sea.

It was already known 2,500 years ago, and clearly described by Aristotle in 350 B.C., that when water is boiled it gives off steam (vapour) which may be condensed on a cool surface to furnish "distilled" water quite free from any of the solids which might have been dissolved in the original water. Until quite recently simple distillation of this kind was widely used, especially in ships, for obtaining fresh water from brine. It paid little regard for the energy economics of the process: heat was expended in evaporating the salt water and then wasted in condensing the vapour, although it was well known that to change every gram of water into vapour one must supply 537 units of heat, the bulk of which might readily be recovered in the water used for condensation and applied again. This and other properties of water, notably the lowering of its boiling point which occurs when it is heated at reduced pressure, are now fully exploited in large modern desalination plants all over the world. Over 100, each producing from 1 to 6½ million gallons of distilled water every day, mainly from the sea, use an advanced technique known as "multiple stage flash" procedure, and some have adopted nuclear fuel as their source of heat.

While most desalination processes to-day are founded on such changes of state, passing reference must be made to new lines of development of deep interest where heat is not applied to cause vapourization. When water freezes to ice at the same temperature every gram gives out 79 units of heat as "latent heat". Ingenious use is made of this in the desalination of salt water by a freezing technique, when the ice formed is practically pure and free from salt, while the increasingly salt mother-liquor is made to receive the liberated latent heat units.

The process of osmosis operating across a semi-permeable membrane between two solutions of different concentrations is well known to every student of botany or physics, but "inverted osmosis", where the usual direction of flow of ions across a membrane is reversed, is not widely practised. It is a most promising procedure for desalination at ordinary temperatures. Reversal of what is the normal direction of osmotic flow of a solution is achieved by a recent special advance in the development of cellulose-type membranes, by the use of considerable differences of electrical potential between the electrodes. Membranes most suited to each application are so arranged that a solution of brine between them is made to undergo continuous desalination. In this process of reversed osmosis, which may be styled "ion dialysis", the ions of sodium and chlorine are made to flow in opposite directions to the electrodes through the membranes, no application of heat being required. When the salinity of the brine has been reduced to below 500 parts per million it can be used for drinking or agriculture, this process being well designed for installations of small or medium capacity.

Another promising procedure, this time with a chemical basis, rests on the discovery that if propane or butane gas is forced through brine, crystals of water chemically combined with the hydrocarbon separate out. These crystals are virtually free from salt and are a ready source of pure water.

Unquestionably the greatest development must come through the availability of nuclear energy, so easily transported and cheaper than any earlier source of power. In this development Great Britain leads the world and can hold the initiative if our statesmen can rise to our responsibility and opportunity for ensuring that world needs are satisfied—for pure water, for quenching thirst, for irrigation of land and (most important of all) for coping with the colossal demands of modern industry and manufacture.

It has been shown that if we built a nuclear desalination plant on the British coast we could, from such an installation, at a cost of £66½ million, have at least 60 million gallons of fresh water a day and in addition feed 400,000 kilowatts of electricity into the national grid. The nuclear fuel could be "made in Britain", for example by enrichment of naturally occurring uranium ores into transuranian forms which are fissible and accordingly able to supply more heat when they decompose. This technique is universally understood where plutonium is made to be the intermediate element concerned. By its use nuclear energy must remain the cheapest and most accessible of all sources of heat as long as sources of uranium are available from the earth's crust.

H. E. Clarke

Zoology - Ornithology and General

During this year 20 Field Meetings were arranged and conducted for this Section and were spread, as usual, over the four Seasons.

Weather was mainly favourable, but one of the winter periods of high rainfall caused such flooding of the Avon and Stour that it resulted in the very rare sight of no mud at Stanpit at the tidal "low". Other Stanpit visits always produced plenty of wader and other interest, from Herons, Curlew and Whimbrel to Knot and Little Stint. Snipe have continued scarcer, indeed noticeably so, but Turnstones, Reed Buntings, Wheatear and Goldfinches more common. Bearded Tits were also seen. It is still a fascinating place; one never knows what may appear quite unexpectedly.

Poole Harbour shore provided nothing very rare, but was always interesting with its Curlew, Godwit, Grey Plover, Redshank, Grebes (3 species), Mergansers, Shelduck, Mallard, Wigeon, Teal, Tufted, and numerous small waders.

In February a sunny lunch hour was spent looking out across Little Sea. There were numerous duck, but the outstanding sight was that of seventeen Canada Geese which rose from the water and formed a departing skein across the sky like a reproduction of a painting by Peter Scott.

Spring migrants were noticeably delayed by the weeks of northerly winds, which accounted for their scarcity at some Meetings; but the increasing spread of more people into the country is affecting Field Meetings from the point of view of bird population and the variety of species seen. Puffins were again scarce at Durlston Head, but Whinchat were seen on the hill, in addition to other interesting small birds. At the Ballard Down Meeting a very high wind probably robbed members of the sight of Clouded Yellow Butterflies, flocks of which crossed the south coast at the beginning of September.

At the Meeting on May 10th the Chairman arranged a recording, with comments, of some 60 British species, some familiar, and many others not so well known. There was a very interested audience which obviously included a number of knowledgeable listeners.

The year contained three outstanding Lectures. On October 10th Miss K. M. Bennetts's subject was "Deer of the New Forest". After dealing with the Fallow in some detail she passed on to the Red, the Roe and the Sika, clearly emphasizing their similarities and differences of form and habit. All were well illustrated on the screen and by seven fine specimens of antlers, one in velvet. Following this Lecture, on October 18th and again on June 6th, she led us into the Forest where deer could be seen. The June occasion was unique, as it included a visit to the extensive Museum of Mr. Courtier who gave a detailed account of the Management of the New Forest Deer.

On November 19th, Oliver Hook, F.Z.S., gave a fascinating account of the "Grey Seals"—their distribution, numbers, breeding and growth; and traced the seal's life from birth onwards. All was profusely illustrated by film taken by Mr. Hook during extensive observation on our coasts and the northern islands. At the close the skins of both cub and adult were displayed.

On March 15th, Michael Hollings, D.SC., Vice-President of the Sussex Ornithological Society, lectured on "Birds of Sussex and the Costa Brava". Dealing first with Costa Brava, he showed that many birds found there were similar to our British species, though differing somewhat in plumage or other detail. The colour film showed the reason clearly: they lived and bred in similar habitats. The second part dealt in detail with the birds of Sussex: the present position as to breeding pairs, the effects of increasing population and development, and even of the alteration of the coastline due to natural causes. An interesting running commentary accompanied both film and slides.

At the meeting on May 10th, the Chairman arranged a recording, with comments, of some 60 British species, some familiar, and many others not so well known. There was a very interested audience which obviously included a number of knowledgeable listeners.

I cannot close this final report without expressing the pleasure it has been to conduct Field Meetings for Members throughout the last eleven years, during which period the birds were only part of the enjoyment.

H. V. HARRIS

Zoology - Entomology

In his rare insecta list of last year the Chairman mentioned in addition two species of ARACHNIDA, namely *Eresus cinabarinus* and *Argiope bruennichi.** The latter is a continental species and a recent immigrant to Britain. On October 4th, 1966, an adult female *A. bruennichi* was found in a Christchurch garden. A search for an egg case during the winter met with no success, but in September 1967 another fine specimen was found in the same garden. It would appear that the area is supporting a colony of this extremely rare species.

DRAGONFLIES

ODONATA. ANISOPTERA. *Aeshna grandis* arrived at its customary area in the Avon Valley in late August. It does not breed in the area, but is a visitor from the North of the County. The breeding area for *Gompus vulgatissimus* was very severely flooded in the early part of the summer, and this could well have made emergence difficult. Larvae may have been swept away from their habitat. However, this is not expected to seriously affect the colony for next season. *Cordulia aenea* and *Libellula fulva* both had a successful emergence in more than one locality. Although not in this immediate area, *Leucorrhinia dubia* had a good emergence this year; its conservation is in very good hands and it would seem to be established. *Somatochlora metallica* was found during the season at several of its classical localities and may possibly be establishing itself in a new site.

ODONATA. ZYGOPTERA. As a contrast to last year, *Ischnura pumilio* was quite numerous in its principal Hampshire locality, and was found in reasonable numbers throughout its season although it was confined to its small breeding pond and did not spread to other areas as it will during a very hot season. *Coenagrion mercuriale* was abundant this year in its local headquarters, which again is a contrast to last year when very few were on the wing. *Platycnemis pennipes* produced a large number of Variety *lactea* at its most abundant New Forest locality.

The new Bournemouth Spur Road, now under construction, will cause much damage to local insecta, and several rare Odonata will be affected. This road will, of course, cause great damage to fauna and flora generally.

THE FRASER COLLECTION OF ODONATA

Of the 43 species on the British list of Odonata, the Society's collection, though small in size, contains 31 British species and 2 exuviae. As several species of exuviae can be found without great trouble in this area and owing to the present shortage, any Odonata exuviae found by members can be identified and added to the collection. Of the 31 species, 18 are Anisoptera and 13 Zygoptera, with both sexes of 16 of the former and all of the latter. The collection totals 80 British specimens. The Society also has a drawer of exotic Odonata, showing the extreme variation in form of the Order around the world. Species of particular interest in the British collection are: three *Gomphus vulgatissimus* and one exuva, a pair of *Sympetrum fonscolombii,* two male *Somatochlora metallica,* a pair of *Ischnura pumilio,* and three *Coenagrion mercuriale.* Other species include *Aeshna mixta, Cordulia aenea, Libellula fulva, Coenagrion tenellum* and *Erythromma najas.*

K. G. GOODYEAR

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*Earlier observations of this rare spider have been recorded in the *Proceedings*: Vol. XXXV 1944-45, Page 18:—

"The Spider found by Mrs. Marshall Bell in 1940, and then identified as an American species, Miranda (*Argyope*) *aurantiaca,* is now stated by Dr. Bristowe (Ann. & Mag. Nat. Hist., Ser. II, vol. 11, p.839, Dec. 1944) to be *Argyope Bruennichi,* a European and Asiatic species, ranging as far East as Japan. Before 1940 it had only once been found in England (Rye, Sussex, 1922); but it has since been seen by Mr. Beeching Hall at Parkstone, and by Mrs. Bell at Iford. The male spider was found at Southbourne for the first time in 1945."—*Ed.*

Presidential Address
Some Aspects of Geological Studies in the late Seventeenth Century

by Professor FRANK HODSON, Ph.D., B.Sc., F.G.S.

Delivered before the Society on the 14th October, 1967

In 1868, Julius Schvarcz published a work entitled *The Failure of the Geological Attempts made by the Greeks* in which he attempted to identify the factors involved in the ineffectiveness of the Greek contribution to the earth-sciences. Now, the late 17th century in England was another golden period of intellectual achievement and, in that period also, the science of geology was but little advanced. My purpose is to discuss the work of some 17th century "geologists" and to try to see why they failed.

Anyone who takes the trouble to become acquainted with the materials which make up the earth's crust must eventually realise (i) that some rocks are layered or stratified whilst others are not; (ii) that the planes of division between the layers of the former are sometimes horizontal and sometimes inclined, folded or broken; (iii) that stratified rocks often contain objects assuming organic shapes either of animal or vegetable aspect and (iv) that any exposure of rock is of limited extent.

A geologist, today, would interpret these observations as indicating that, at the particular locality where the above facts could be demonstrated, the place had formerly been one into which sediments of various sorts had periodically been carried and which had settled and compacted there. He would envisage such sedimentary layers to have been originally more or less horizontal and that the organic shapes, or fossils, to be the remains of animals and plants which either lived where the sediments accumulated, or were naturally transported there and had become entombed in the thickening sedimentary pile. He would deduce that these soft sediments, muds, sands, oozes and the like had later been lithified into coherent rock which subsequently had been ruckled by lateral squeezing so that originally horizontal bedding-planes had been folded and sometimes fractured also. Finally, he would convince himself, by induction based on many like observations, that all this happened long ago but that on the modern globe similar regions were today receiving similar sediments which would eventually undergo similar transformations. In fact, it is today realised that the history of the earth can be read in the rocks which testify to the changes which have passed over its surface. The way to read the rocks as history was pointed out around the turn of the 18th and 19th centuries. Before that time, the possibility was hardly realised although much of the evidence for it had been inspected and some of it interpreted correctly.

Now, in order to read a stratified sequence of rocks as a historical narrative, it is necessary to invoke three principles. First to be appreciated is the apparently trivial generalisation that, unless some process has inverted the sedimentary pile, the younger strata lie on top of the older. This is the principle of *superposition of strata* which enables the beds in a visibly continuous section of strata to be arranged chronologically. Secondly, since no single exposure of rock reveals the whole of the stratified succession, it is essential to continue the sequence above and below the limits of the first by recognising, in another geographically isolated exposure, a bed which is the same *age* as in the former. This is the technique of stratigraphical *correlation* which, by repeated application to many sections, enables the fragments to be pieced together so that a compound reference section of the geological column is synthesised.

Finally, it is necessary to be able to infer from the nature of the sediment and its fossil content, the sort of geographical environment under which such material was formed and so infer a succession of geographical changes which a particular region has undergone. This is done by reference to what is happening today by studying what sort of material is characteristic of deserts, deltas, estuaries, coral reefs, glaciated regions and a multitude of other environments in which sediments are accumulating. This part of the stratigrapher's task is conditioned by a very sophisticated principle called *Uniformitarianism,* which insists that geological change be explained in terms of similar processes acting with the same sort of intensity as those which we can today observe operating on the surface of the modern globe. The acceptance of this generalisation has very important consequences for an estimate of the time span represented by the geological column and thus for a lower limit to the age of the earth. In fact, since at the present time sediments accumulate only slowly and geographic change is so slow that maps made long ago continue to be useful, it follows that, if we employ the modern analogy, a sequence of strata, many thousands of feet thick, containing marine fossils, represents a very long time interval. This lengthy span is required not only for the sediment to accumulate but also for the completion of the process which has elevated them into dry land where today they might even form the summits of mountains.

But, in 1658, Archbishop James Ussher published his *Annals of the World,* over 900 folio pages of intimidating erudition and astonishing scholarship. In this work he provided a series of dates for biblically recorded events which were mutually consistent, that is to say that, if they were accepted, no chronological contradictions would ensue. In this scheme, the date of Creation was 4004 B.C. Thus, in the mid-17th century, the "novity of the world" was ingrained into the thinking of educated men. In the grip of such a straitjacket, free-ranging speculation on features of the earth's crust was greatly hampered.

Let us examine systematically, the 17th century discussion on the significance of stratification, fossils and stratal interpretation. The real nature of stratification was plainly stated in 1669 by Nicholas Steno, a many-sided genius, born in Copenhagen, but who did most of his scientific work in Padua. Steno must be credited with having defined the formal bases of a number of disciplines relating to the earth sciences in addition to his significant contributions to anatomy. Thus he first stated the law of the constancy of the interfacial angles of crystals. He demonstrated that certain objects dug from the clays in Malta, and for long known as *Glossopetrae,* or snakes' tongues, were in fact fossil fish-teeth; but his most important work for our purposes was his treatise of 1669, usually referred to as the *Prodromus.* This was intended to be a prelude to a larger work dealing with geological matters but which was never published. Nevertheless, there is enough in the *Prodromus* to show that Steno was on the right track. He pointed out three features about the formation of modern sediments which, although they may sound trivial, form the basis of stratigraphy.

First, a layer of sediment is laid down on top of a previously consolidated or semi-consolidated precursor. Secondly, layers of sediment are laid down approximately horizontally and finally beds of sediment occupy a limited area.

The first observation leads to what is now called the law of superposition of strata which states merely that in a normal sequence of sediments the younger beds lie on top of the older. This means that, when we see a visibly continuous sequence of strata, we can read it as a time sequence and gain our first insight into the history of the earth's crust. Steno's second observation is the basis of structural geology. It is a common observation that ancient sediments are no longer horizontal and Steno tells us that this departure from horizontality is a feature which has been secondly acquired. The forces which buckle and rupture the originally continuous, horizontal layers of sediments are themselves manifestations of some notable episode in the history of the earth's crust.

Steno's third observation concerning the limited extent of a particular type of sediment is also most important. Beyond its boundaries, the sediment will pass either into sediment of a different type, the product of a different lithogenic environment, or into an area where no sediment has accumulated. In the latter case there will be no stratal representation of that particular interval of geological time. At that time, on land, actual erosion may take place. One of the important consequences of this third observation is that we cannot expect to recognise contemporaneous sediments by their lithological nature. At the mouth of a river, we may well have sandy detritus accumulating at the same time that muds are being laid down further out to sea and limey oozes accumulating beyond the mud belt. Thus, as representative of the same period of geological time, we may have the lithified products of these sediments, namely sandstone, shale and the limestone, all laid down at the same time. When these sediments are later elevated into dry land and become available for the geologist's inspection in cliffs, river banks and quarries, it is very unlikely that we shall be able to trace continuously the change in sediment character from one place to another. We shall see only isolated exposures whimsically located by accidents of erosion or industrial acitivity. It is this that limits the usefulness of superposition. So long as the beds are visibly continuous they can be read as a time sequence. When they are isolated, another technique is required to recognise the contemporaneity of ancient sediments, but before we discuss how this technique was discovered it is necessary to say that Steno's views were by no means universally accepted at the time, although only two years after publication they were translated into English.

A completely different explanation of stratification proved more to contemporary taste. This was due to John Woodward (1665-1728), a Derbyshire man who became Professor of Physic at Gresham College, today mainly remembered as the founder of the Woodwardian Chair of Geology in the University at Cambridge but who in his time was notorious for his vanity and dogmatic assertions. Woodward's notions are contained in his *"Theory of the Earth"* (1695). He imagined that the pre-diluvian earth consisted of a rocky shell enclosing a central abyss filled with water—the receptacle of the biblical "waters of the deep". By some unexplained process at the time of the Flood, these waters came to lie as an outer shell above the rocks, which they proceeded to digest and transform into a "conflux", that is to say into a slurry with a porridge-like consistency. What sustained this mass above the now empty abyss is not recorded and, equally mysteriously, the animals and plants of the pre-diluvian globe escaped disaggregation and remained whole. This mess of thick mud, studded with fossils, settled out in layers according to the specific gravity of the particles. The fossils thus came to lie embedded in matrices of similar density, which proceeded to harden into rocks. Thus the layered structure of the fossiliferous rocks was achieved. What happened to the excess water after lithification of the slurry we are not informed.

The *Theory* contained other observations and deductions not all of which were without merit. Woodward appreciated that fossils were once living organisms but his notions on the origin of stratification were very competently discussed by a contemporary more often remembered in literary than scientific circles. Dr. John Arburthnott (1667-1735) wrote a number of things wherein Dr. Woodward, in various guises, appears in an unfavourable light. Thus Woodward is barely concealed under the character Dr. Fossile in the comedy *Three Hours After Marriage* which Arburthnott wrote with Gay and Pope. Woodward's antiquarian doings are satirised in *Martin Scriblerus* of which Arburthnott was part author and the robust, scurrilous piece *The Death of Dr. W-d-d* has been attributed to him. However, the crudity of the last contrasts so strongly with the habitual elegance of Arburthnott's writings that his authorship of this seems improbable. But notwithstanding the banter in these productions, Arburthnott's *Examination of Dr. Woodward's Account of the Deluge* (1697) is a serious, courteous, but nevertheless damning attack in which the author shows considerable penetration. Particularly notable in his argument against the existence of a continuous concentric shell of water beneath the earth's crust, which was a common postulate of the times influenced by the biblical record of "waters of the deep". This popular idea really only received its death blow in 1798 when Henry Cavendish weighed the world and, dividing its mass by its volume obtained a value of 5.45 for its average specific gravity. This showed that the internal materials of the earth were indisputably heavier, not lighter, than the surface rocks. Arburthnott seems not to have known of the specific gravity of the globe although Newton in 1687 had conjected it to lie between 5 and 6. He examined the plausibility of Woodward's concentric density stratification from a point of view which anticipated some of the thinking which led to the modern theory of isostasy. Arburthnott contrasted Steno's and Woodward's views on stratification and noted the essential differences between them, namely that Woodward employed a short-lived event whilst Steno invoked the cummulative effects over a protracted period of time. But he went no further—like Steno himself he was content to know how strata had formed—the consequences of holding such a belief remained undiscussed.

Having thus briefly spoken of stratification let us turn now to the significance of fossils. Fossils are the remains of once living animals and plants which became entombed in ancient sediments. This is an explanation which has not always been accepted and the reasons for incredulity are not far to seek. In the first case the materials of which they are composed is not that of the original. They must have been somehow converted into stone. Again, what seem to be marine creatures are often found high and dry on land far away from the modern seas and even on the tops of high mountains. Another perplexing thing is that often they cannot be matched with anything in the living fauna and flora. Thus, acceptance of modern notions concerning the true nature of fossils involves accepting the possibilities of the elevation of sea floors, the extinction of earlier forms of life and processes whereby skeletal material can be mineralised. Today we have no difficulty in accepting these consequences because we can concede that the earth is very old and that the earth's crust shows the cumulative effects of slow-acting causes—in fact, that the biblical account of Creation is not to be taken literally.

Martin Lister (1638-1712) was the foremost conchologist of the late 17th century and there is no doubt from his writings on this subject that he was an accurate and disinterested observer. In his day, his opinions on the true origin of fossil shells clearly would carry considerable weight and this opinion was uncompromisingly against their organic origin. He considered them to have been produced by virtue of some plastic force moulding the strata into pseudo-organic shapes. He does not seem to have been unduly influenced by any theological difficulties that an organic origin might produce, but he placed great weight on their mineralised nature. Marine shells, to him, ought to be made of the shelly substance so characteristic of the inumerable modern examples which had passed before his competent eye. He was also impressed by fossils which, we now know, have been flattened by pressure. He saw these as insubstantial marks on the rocks. Finally, what may have carried greatest weight with him, was the undoubted fact that many of these fossil shells, if organic, could not be matched with the modern species which he had so ably systematised.

Robert Plot (1640-1696) was first Professor of "Chymistry" in the University of Oxford and first Keeper of the Ashmolean Museum there. He set the fashion of writing topographic histories, being responsible for Oxfordshire (1677) and Staffordshire (1686). In those well illustrated books he wrote on the origin of fossils of which he had made a considerable collection. He had been specifically asked by Hooke and Ray to bring to bear his considerable experience of fossils in order to pass an opinion as to their origin. Upon "mature consideration" he came down in favour of Lister's opinion that they were self-generated stones in defence of which he cites seven reasons. First, even if the Flood was a global event, shells should have been carried down to the sea rather than stranded on dry land. Even were the flood waters tempestuous enough to have swept shells onto the land, one would expect them to have been concentrated indiscriminately in valleys and it is difficult to see how they were marooned on hilltops and sorted into layers dominated by certain species.

A second consideration allows a submergence of England and a subsequent raising of mountain tracks by earthquakes, but, as Plot notes (in the context of a relatively young globe) this would imply a much more spectacular. terrestrial dynamics in the ancient world than those which we see today. Thirdly, if these objects really were once living shellfish, why are forms found which are today not living. Is it likely, asked the perplexed Doctor, that Providence which took such care to preserve all living things at the time of Noah's Flood would permit some species of shellfish to become extinct. Fourthly, there is even dispute as to what division of the animal kingdom certain fossils ought to be referred. Fifthly. some fossils which otherwise look like modern Bivalves are found with only one valve. Plot sees a sixth difficulty in that shells of the same kind are found at particular localities whilst different sorts occur elsewhere and asks why do bivalves with both their valves leave them sometimes open and sometimes closed. Finally, when faced with an occurrence of fossils still retaining their original shell, Plot goes to ludicrous lengths to deny their antiquity. In the clay pits near Reading there is a bed of oysters, which there as elsewhere characterises the base of the Eocene strata above the Chalk. These oyster shells, Plot maintains, are the refuse of food supplies for a Viking army during a campaign against King Alfred!

Edward Llwyd (1660-1709) was a Welshman of Jesus College, Oxford, who acted as Dr. Plot's assistant at the Ashmolean Museum and afterwards succeeded him as custodian of the collections of that recently founded institution. He was a great collector of fossils, some of which he sold to eke out his miserable salary and published a small illustrated book on them in 1699. He was naturally interested in their origin and exercised his wits to formulate a theory which would at once account for them and at the same time accord with what the sacred scriptures were believed to assert. We have Llwyd's conclusions on this important matter in a letter to John Ray who had asked him directly for his opinion. Llwyd sees a division of fossils into what he calls Marine Fossils and Mineral Leaves. He has been asked to say whether he regards them as produced by plastic forces in the earth or as the spoils of the Universal Deluge.

He rejected the Deluge Theory because (1) Such a deluge should not have buried these shells, etc., at depth. Although the rocks now hard were then soft, there seems no force sufficient for injecting shells into such material and he has found them enclosed in beds 200 fathoms deep. (2) Fossils occur on the roofs and sides of caves. Although it would be possible for shells to have been forced into caves by marine floods, how could they have been brought to such situations? (3) The flood ought to have left debris of land animals but these are rare. Most fossils are of marine origin. (4) Fossils have been mineralised so that they are composed of the same substance as the matrix which encloses and fills them. How has this happened? (5) There have been assertions (which Llwyd is inclined to accept) that living animals have been found enclosed in fossil shells—these could not have been living since the Flood. (6) Llwyd asserts that mineralised and unaltered shells are found in the same bed yet, if deposited by the Flood, they would have been expected to have undergone similar changes to have been brought into the same condition. (7) The enormous quantities of fossils (such as crinoid stems in the limestone of Wales and the North of England) seems to speak against deposition by any short-lived event. (8) Some fossils seem to be merely mineral representations of the shells they most nearly resemble: for instance, the flattened pectens of the coal strata. (9) Many fossil forms cannot be matched in the modern fauna, at any rate in the British seas. (10) Mineral shapes are produced in the bodies of living creatures including such objects as gall-stones in men.

Having said this much about fossils, Llwyd continued with a discussion of fossil plants. He noted that (1) Fossil plants are found at depth, contrary to the surface distribution which we see on modern sea-shores when foreign vegetation is cast up today. (2) Plants are associated with coal and never with flint, limestone and "common rock". (3) Flood debris should consist mostly of British plants, yet fossil plants are not similar to those of the modern British Flora. (4) Leaves occur profusely, trunks only rarely. (5) Fossil leaves seem smaller than their nearest living counterparts and many specimens seem to be mere impressions which have no real substance. (6) Fossil insects (such as, for instance, those found in amber) could hardly have been buried at so great a depth by the Flood. As to fossils being the result of plastic squeezing of strata or of crystallisation of salts, Llwyd asked how could this result in compound objects such as articulating joints. All this leads him to suggest a third explanation, namely that fossils are the imperfectly developed products of seeds and fertilised eggs washed into cracks and crevices in the rocks.

John Ray (1627-1705) was the most distinguished systematic botanist of the 17th century. He at first conceded that fossils were the remains of once-living organisms. He noted also that their burial at depth implied that the sea floor had been built up by sediment and firmly rejected that fossils were the result of plastic deformation of strata. He considered as implausible, because of its brevity, that the Noachin Deluge was responsible for the litter of sea-shells now high and dry on land. He even had an explanation for the occurrence of fossils on mountains, considering that all the earth's surface had once been covered by the sea, that elevation had raised parts of it and that the gradual emergence of land might have been temporarily reversed so that periodic floodings might have deposited sediments around its skirts. "Yet on the other side there follows such a train of consequences as seems to shock the Scripture-history of the novity of the world." It was this realisation which caused him finally, although half-heartedly, to subscribe to Llwyd's "seed" theory.

No better illustration of the difficulty under which a Christian found himself in this matter of the origin of fossils is to be found than this uncertainty of John Ray. Here was no man writing out of vanity, seeking preferment or afraid to lose a job but one who, devoutly holding to the authority of the Scriptures, had spent much of his time enquiring into the true origins of things with which he had become acquainted in his natural history studies. At one time he was almost in possession of the truth but it was impossible to reconcile this with Genesis. Thus he had finally to admit his perplexity and acknowledge that he did not know.

BRITISH MUSEUM
28 MAR 1968
NATURAL HISTORY

Robert Hooke (1635-1703) was the distinguished "curator of experiments" to the Royal Society. He is perhaps best known to posterity by the discovery of Hooke's Law concerning the extension of springs and by his beautifully illustrated and acute observations on microscopic objects. But his interests were wide and included reflections on the cause and significance of earthquakes. His views, however, were only known by word of mouth until the publication of his collected works in 1705. Hooke was under no delusion as to the real nature of "formed stones". Not only did he recognise that some represented extinct species but he remarked that, "like the coins of the archaeologist, it might not be impossible to raise a chronology out of them". It is a great pity that he never proceeded to do so. He was in possession of an essential ingredient for the maturing of stratigraphy and it required nearly a century and a half for the principle to be independently discovered and documented.

For more than half a century after about 1710 the tempo of science and scholarship slackened considerably. It would make an interesting study to discover the reasons why the momentum of the late 17th century almost ground to a halt in so many fields of learning. It produced a strange hiatus in the development of earth sciences. In physics at least, Boyle's Law, Hooke's Law, Newtonian gravitation and optical theory had been established as a sure ground for further development, even if this proved slow. Linnaean systematics remained as a firm foundation for the biological sciences. The calculus could not be lost and the raw materials of historical and linguistic studies lay permanently enshrined in the massive works of Dugdale, Hicks and their contemporaries.

But the fundamental axioms of stratigraphy had not crystallised from the amorphous heap of indiscriminate observations. The hiatus was not due to neglect but to real ignorance. Steno and Hooke had been on the brink of a vast new field of knowledge but had stopped short. Their 18th century successors with few exceptions had not pressed on. Indeed, in Germany, Werner had taken a step backwards by insisting that rock-forming conditions had altered during the course of time. It was left to Hutton in 1795 to provide the key, to enunciate in a somewhat confused and verbose manner the Principle of Uniformitarianism. This achievement cannot be over-rated. Of the three bases for the extraction of earth history from the rocks, this undoubtedly required the greatest penetration. It was lucidly simplified by Playfair (1802) and finally, fully documented by Lyell in the *Principles of Geology* (1831-3) which was concerned first to establish the fact of uniformitarianism and then to exploit its consequences—a pattern of presentation copied 26 years later by Darwin on natural selection.

By the time Lyell was writing, the problem of correlation was also solved. In 1816, William Smith published his *Strata Identified by Organised Fossils* in which he realised Hooke's dream of a biological clock. "Strata" Smith was an engineer, canal surveyor, and land drainer who, in the course of his professional duties, discovered that the relative age of a bed could be deduced from its fossil content which was, to some extent, independent of its lithology. This discovery enabled him to make a geological map of England in which the distribution of beds of the same *age* were depicted in the same colour. This is a true geological map as contrasted with a mere mineralogical map which groups together beds of the same rock type and which is academically barren.

Once the basic principles were established the whole subject quickly crystallised. Although it was left to Darwin in 1859 to provide the explanation for the changing composition of the organic world, Smith's empirical scheme had by 1840 resulted in the compilation of a standard geological column pieced together from a multitude of local fragments. Everyone familiar with the evidence granted its implications and the sceptics were finally driven to the position taken by Gosse in his *Omphalus* (1857) to declare that the world was created as told by Moses but already with its fossils in place in deceptive regularity. The idea of a mischievous Creator, however, gained little support and could not today stand up against the results of the use of radioactive decay for the determination of the "absolute" age of strata. We now know that the earliest fossiliferous rocks are some 600 million years old and that men have dwelt on the surface of the earth for only about 1 million years. A great deal of prejudice was required to be swallowed in granting that the earth was immensely old and mankind very young. Nothwithstanding the intellectual furore of the 17th century and its bold attack on the frontiers of contemporary knowledge, the philosophical climate of the day set limits to the gaze even of the keenest-sighted, early explorers of the distant, misty regions of the earth's history.

PUBLICATIONS RECEIVED

The following publications were received in the Library during the year. Some of them were gifts from members who subscribe personally to the particular Society. The Library Committee are glad to record their appreciation of such gifts.

1. Publications issued by a Society

Birmingham Natural History & Philosophical Society—*Proceedings.*
Botanical Society of the British Isles—(1) *Watsonia,* (2) *Proceedings.*
Bristol Naturalists' Society—*Proceedings.*
British Association for the Advancement of Science—*Science.*
British Deer Society—*Deer News.*
British Trawlers' Federation—*Report and Pamphlets.*
British Trust for Ornithology—(1) *New Bulletin,* (2) *Bird Study.*
California Academy of Sciences—*Proceedings.*
Cambridge Antiquarian Society—*Proceedings.*
Carnegie U.K. Trust—*Annual Report.*
Cotteswold Naturalists' Field Club—*Proceedings.*
Council for Nature—(1) *News for Naturalists,* (2) *Habitat.*
Croydon Natural History & Scientific Society—*Proceedings.*
Dorset Natural History & Archaeology Society—*Proceedings.*
Fair Isle Bird Observatory—*Annual Report.*
Fauna Preservation Society—*Oryx.*
Geological Association—*Proceedings.*
Hampshire Field Club & Archaeology Society—*Proceedings.*
Hampshire Field Club: Ornithological Section—*Bird Report.*
Hastings Natural History Society—*Journal.*
Hertfordshire Natural History Society—*Transactions.*
Historical Association—*Pamphlets.*
Isle of Wight Natural History & Archaeological Society—*Proceedings.*
Linnean Society of London (Botany)—*Proceedings.*
Lloyd Library & Museum, Cincinnati—*Lloydia.*
Men of the Trees—*Trees and Life.*
National Coal Board—*Coal Quarterly.*
National Trust—*News Letter.*
North Gloucestershire Naturalists' Society—*Journal.*
Osaka Museum, Japan—*Bulletin.*
Royal Commonwealth Society—*Journal.*
Royal Horticultural Society—*Journal.*
Royal Society for the Protection of Birds—*Bird Notes.*
Senckenbergischen Naturforschenden—*Natur und Museum.*
Severn Wildfowl Trust—*Annual Report.*
Smithsonian Institution, U.S.A.—*Annual Report.*
Societé Jersiaise—*Annual Bulletin.*
South-Eastern Union of Scientific Societies—*Proceedings.*
South London Entomological & Natural History Society—*Proceedings and Transactions.*
Torquay Natural History Society—*Transactions and Proceedings.*
Tromso Museum, Norway—(1) *Astarte (short papers),* (2) *Acta Borealia.*
Upsala University, Sweden—*Acta Phytogeographica Suecica.*
U.S. Information Service—*Pamphlets, Science Horizons.*
West Wales Naturalists' Trust—*Nature in Wales.*
Zoological Society of London—*Newsletter.*

2. Periodicals received

Nature, British Birds, Antiquity, Geographical Magazine, Animals, Science Journal.

The Bourne Press, 3/11 Spring Road, Bournemouth